. 1607/ 4061

THE
Accountant's Companion;
OR,
Schoolmaſter's New Aſſiſtant
TO
PRACTICAL ARITHMETIC.

WHEREIN
The Rudiments of Common Arithmetic,
Vulgar aud Decimal Fractions, are delivered in a
new and more conciſe Method than hitherto publiſhed.

WHEREBY
The vulgar Error of confounding Principles together,
and the diverſifying them into ſeveral Rules when they are built
on the ſame Reaſon is carefully avoided.

WITH A SUFFICIENT
VARIETY of EXAMPLES,
Operated in the neateſt and moſt approved Methods.
Alſo the Extraction and Use of the
SQUARE and CUBE ROOTS, &c.
With their Application to various Branches of
the Mathematics.
DUODECIMALS proved by PRACTICE, &c.
And applied to Work performed by Joiners, Painters,
Glaziers, Paviours, &c.

TO WHICH IS ADDED,
A COURSE of BOOK-KEEPING
By SINGLE ENTRY;
Very neceſſary in facilitating the Acquiſition of the Italian Method, and is extremely uſeful for many Kinds of Buſineſs
in which the latter is not materially wanted.

The whole adapted to the Uſe of Merchants, wholeſale and retail
Dealers in every Branch of Buſineſs.

By J. SEALLY,

Author of the Univerſal Tutor ? or, New Engliſh Spelling-book and
Expoſitor, &c. and Maſter of the Academy in Bridgewater-Square, Barbican, London.

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PREFACE.

1607/4061

To the SCHOOLMASTERS *of* Great-Britain, Ireland, *&c.*

GENTLEMEN,

IT would be a preſumption in me to point out to you the many and great advantages that reſult from the knowledge of Arithmetic; eſpecially as all mercantile affairs, and [illegible], do abſolutely depend upon it; no wonder then that ſo many efforts have been made to bring it to the utmoſt degree of perfection.

I am truly ſenſible there are extant many excellent ſyſtems of Arithmetic; but I am fully perſuaded, the method here taken, the conciſeneſs of its rules, and the neatneſs of the ſeveral operations, will ſufficiently evince, that this work is by no means ſuperfluous or unneceſsary; and I flatter myſelf (in conſequence of the many gentlemen employed in this laborious province of inſtruction, who have decidedly approved of the manuſcript) that the in-

A 2 ſtructions

B M

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What a pity is it, that a learner ſhould be confounded, at his firſt entrance into figures, with ſo many pages of tedious inſtructions, as a multitude of our modern authors have done, by confounding principles together, and then diverſifying them into a multiplicity of rules and caſes, when a much eaſier way may be taught him in a few lines, and that too with more forcible evidence to the young underſtanding, and far greater ſecurity to the memory.

It has been univerſally allowed, that it is a taſk too hard for children to be made compleat maſters of Arithmetic, conſequently the moſt practical method that can be adopted is, firſt, to give them a general notion of it in the eaſieſt manner, and next to enlarge upon it as they encreaſe in years and underſtanding. The celebrated Dr. Watts ſays, That Arithmetic is the more valuable, as it is the more exact, eaſy, and ſhort; ſo that the art lays in giving as few rules as poſſible, and clearly explaining them; and, as I have already obſerved, not confounding principles together and then diverſifying them into ſeveral rules, when they are built on the ſame reaſon; which, the doctor adds, has not only made Arithmetic ſeem difficult of acceſs, but has alſo hindred many from being accountants.

In the proſecution of this work, the utmoſt care and attention have been to render the whole as plain and conciſe as poſſible, and in treating of every article which is neceſſary or eſſential to the knowledge of buſineſs.

The operations of Addition, Subtraction, Multiplication, and Diviſion, are delivered firſt in ſimple numbers, and afterwards in compound; for that is certainly the order in which they ſhould be taught.

In Compound Multiplication, there is ſhewn the beauty and uſe of that excellent rule, in reſolving moſt queſtions that occur in merchandizing.

In the Rule of Proportion, there is omitted the many vulgar diſtinctions of it, as has been commonly done to no other purpoſe than making needleſs difficulties, having one general rule for the ſtating and operation, perfectly eaſy in every reſpect: in which rule is comprehended Loſs and Gain, Intereſt, Barter, Fellowſhip, &c. but as ſome may chuſe to tread in the old beaten track, the queſtions are ranged in ſuch order, as to be ſeparately diſtinguiſhed under the heads juſt mentioned.

Practice is copiouſly handled in all its various branches, with brevity and perſpicuity; and in a manner quite different from any treatiſe of arithmetic now extant.

And in order to render this work as uſeful as poſſible, here is given a large variety of operations in the neateſt and moſt approved methods now in uſe among our beſt accountants.

The courſe of Book-keeeping by ſingle entry will, I hope, fully anſwer the profeſſions annexed in the title-page. Should the undertaking, upon the whole, merit another edition, the purchaſers may be aſſured, no pains or expence will be wanting, to render it ſtill more worthy of their encouragement by many uſeful additions.

Any deſired improvement, or friendly correction, will be thankfully received, and duly attended to; and 'tis hoped that the impartial critic will make ſome allowances to a young author, who in his hours of relaxation from ſchool buſineſs, labours to be uſeful to a riſing generation: from this motive I am perſuaded he will forgive thoſe errors which the preſs, want of time, or ability, may poſſibly have occaſioned. Such errors which have eſcaped my notice, and are ſo common to a work of this ſort, will be carefully rectified in a future publication. If any anſwers ſhould have wrong Fecits, they entirely proceed from an overſight in correcting the preſs, as every queſtion has been again and again operated in all its varieties, by many of my boys from the manuſcript itſelf.

GENTLEMEN,

Permit me to return you my ſincere acknowledgements for the favourable reception of my Univerſal Tutor, or New Engliſh Spelling Book and Expoſitor; and particularly to ſuch Gentlemen, who have favoured me with their kind recommendation to the public.

I am,

GENTLEMEN,

your moſt humble and

moſt obedient ſervant

Bridgewater Square,
January, 1770.

JOHN SEALLY.

EXPLANATION

OF THE

CHARACTERS

Uſed in this TREATISE.

+ The Sign of Addition, ſignifies that thoſe Numbers between which it is placed are to be added together.

— The Sign of Subtraction, ſignifies that the latter of any two numbers between which it is placed is to be ſubtracted from the former.

× The Sign of Multiplication, ſignifies that thoſe Numbers between which it is placed are to be multiplied together.

÷ The Sign of Diviſion, ſhews that the former of two numbers between which it is placed is to be divided by the latter.

= The Sign of Equality, being placed between two Numbers ſhews that they are equal.

BRITISH MUSEUM
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THE
Accountant's Companion;
OR,
Schoolmaſter's New Aſſiſtant.

PART I.

ARITHMETIC in general.

DEFINITIONS.

I. ARITHMETIC teaches the properties of numbers, or that by which we diſcover what number of quantities there are either real or imaginary, of any kind, contained in another quantity of the ſame ſpecies.

II. Theoretical Arithmetic, is that ſcience which ſhews the various properties of numbers, and the reaſons and demonſtrations on which the ſeveral practical operations are founded.

III. Practical Arithmetic, is the art of computing, or performing the ſeveral operations, and applying them to practice.

Arithmetic has two parts, Notation and Numeration.

DEFINITIONS.

I. Notation, the art of repreſenting numbers by their proper characters.

II. NUMERATION, the art of eſtimating or pronouncing any number.

The Characters whereby numbers are ordinarily expreſſed are theſe; 1, 2, 3, 4, 5, 6, 7, 8, 9, and (0) cypher.

The NOTATION TABLE.

C Millions.	X Millions.	Millions.	C Thouſands.	X Thouſands.	Thouſands.	Hundreds.	Tens.	Units.
9	8	7	6	5	4	3	2	1
9	8	7	6	5	4	3	2	1
	9	8	7	6	5	4	3	2
		9	8	7	6	5	4	3
			9	8	7	6	5	4
				9	8	7	6	5
					9	8	7	6
						9	8	7
							9	8
								9

The LITERAL NUMBERS.

I	1	XI	11	CC	200
II	2	XX	20	CCC	300
III	3	XXX	30	CCCC	400
IIII or IV	4	XL	40	D	500
V	5	L	50	DC	600
VI	6	LX	60	DCC	700
VII	7	LXX	70	DCCC	800
VIII	8	LXXX	80	DCCCC or CM	900
IX	9	XC	90		
X	10	C	100	M	1000
				MDCCLXIX.	

Obſerve by the above table, that the value of the figures from the place of units encreaſes in a ten-fold proportion.

RULE.

BRITISH MUSEUM

Rule. Prefix cyphers to as many periods and places as are in any propoſed number. Note the place of each ſignificant figure, and taking away the cypher place the given figure in its ſtead.

APPLICATION.

Write down in proper figures the following numbers.

1. Forty five.
2. Five hundred and thirty four.
3. Three thouſand ſeven hundred and two.
4. One thouſand ſeven hundred and ſixty nine.
5. Twelve thouſand and four.
6. Six hundred thirty two thouſand, ſeven hundred and nine.
7. Twenty thouſand and eight.
8. One million, fifty thouſand and twenty ſeven.
9. Fourteen millions, ſix hundred thouſand and two.
10. One hundred twenty three millions, four hundred fifty ſix thouſand, ſeven hundred and eighty nine.

Expreſs in words the following numbers.

92
108
558
4009
50746
819804
219001
7198420
987654321

SIMPLE ADDITION.

DEFINITION.

ADDITION is that rule by which ſeveral numbers are collected and put together, that ſo their ſum, or aggregate may be known.

RULE.

I. Care muſt be taken that the numbers be placed in ſuch a manner that the figure of the ſame value may ſtand underneath each other, *i. e.* units under units, tens under tens, &c.

II. When the figures are placed according to the foregoing directions, each row muſt be added into one ſum, and the manner of proceeding is always to begin Addition at the place of units, and add together all the figures which ſtand in that column ; if their ſum be leſs than ten ſet it down ; but if their ſum exceed ten, ſet down only the exceſs, and for every ten carry one to the tens place, adding whatever you carried and all the figures which ſtand in that column together, in the ſame manner as thoſe of the units were added ; proceed to the place of hundreds, &c. till the given ſum be finiſhed.

EXAMPLES.

Yards.	Pounds.	£.	Ells.
4171	2141	4158	7168
1214	1427	2148	1416
2141	1428	2158	1781
1401	1040	1415	1648
2141	1414	1210	1005
11068	7450		

The DEMONSTRATION of this rule of Addition is very eaſy to be conceived, and depends entirely upon the notation in uſe and this AXIOM, That the whole is equal to all its parts taken together ; or in other words, the numbers which are propoſed to be added, ſhew the ſeveral parts, and their ſum the whole.

PROOF. To prove Addition, divide or ſeparate the given numbers into parcels, and add up each parcel by itſelf, which if thoſe particular ſums added together be equal, or the ſame with the total ſum firſt found, you may conclude the work is right. Or begin at the top, and reckon your figures downwards, the ſame as you added them as before recited.

SIMPLE SUBTRACTION.

DEFINITION.

SUBTRACTION is the rule by which one number is deducted from, or taken out of another, that ſo the remainder, difference, or exceſs, may be known.

RULE.

Let your figures be placed directly under thoſe of the ſame value, *viz.* units under units, &c. Begin at the place of units, and ſubtract the lower figure from that which ſtands over it, ſetting down the difference underneath the ſame: But if the lower figure exceeds the higher, then add ten to the upper figure, and from that ſum ſubtract the lower figure, ſetting down the remainder, carrying one to the next row, and ſubtract in that place as in the former; proceeding thus till the whole is finiſhed. *Note.* If two figures chance to be equal ſet down a cypher.

EXAMPLES.

From	142471	425120	746800	Subtrahend.
Take	74758	175807	679084	Subtracter.
Remainder.	67713			Difference.
Proof.	142471			Proof.

The DEMONSTRATION of this rule depends on the foregoing AXIOM, That the whole is equal to all its parts; the parts of the ſubtracter thus taken ſucceſſively from thoſe of the ſubtrahend (or number to be ſubtracted) all theſe differences muſt make the difference ſought.

PROOF. Add the leſſer number and the remainder together, and if the ſum of theſe two (here called parts) be equal to that number from which the leſſer number was taken (which is called the whole) the work is right.

Simple MULTIPLICATION.

DEFINITION.

MULTIPLICATION is the encreaſing of any number by another, ſo often as there are units in that number by which the one is encreaſed. So is it likewiſe a compendious way of performing ſeveral additions.

To this rule belong three principal members, *viz.* 1. The Multiplicand. 2. The Multiplier. 3. The Product. *Note*, The two former are called Factors.

TABLE of PRODUCTS.

1	2	3	4	5	6	7	8	9	10	11	12
2	4	6	8	10	12	14	16	18	20	22	24
3		9	12	15	18	21	24	27	30	33	36
4			16	20	24	28	32	36	40	44	48
5				25	30	35	40	45	50	55	60
6					36	42	48	54	60	66	72
7						49	56	63	70	77	84
8							64	72	80	88	96
9								81	90	99	108
10									100	110	120
11										121	132
12											144

RULE.

RULE.

Multiply every figure in the multiplicand by the figure in the multiplier, carrying one for every ten, as in addition. When the multiplier conſiſts of more figures than one, there muſt be made as many ſeveral products as there are figures contained in the multiplier: Obſerve to place the firſt figure of every product exactly under its multiplier, add the products together, and their ſum will be the total product or anſwer.

EXAMPLES.

Multiplicand	42628	21581	47168
Multiplier	2	3	4
Product	85256	64743	188672

51461	814610	476814
7	9	12

472518 } Factors
13 }

1417554
472518

6142734

472518
17

472518
21

472518
954036

9922878

472518
25

21429	71421	768410
36	42	78
128574		
64287		
771444		

3412	3251
3251	3412
3412	
170600	
682400	
10236000	
11092412	

The reaſon for ſetting the ſeveral products one figure back is quite obvious, becauſe the cyphers annexed to each product (as in the laſt operated example) are here rejected, as making no alteration in the value of the product, when thus reckoned up. This rule is perfectly DEMONSTRATED by the AXIOM already given, *viz.* That the parts are equal to the whole ; and therefore, to multiply by all the parts is multiplying by the whole.

PROOF. Multiplication is beſt proved by diviſion, for what is done by multiplication, is diſſolved or undone by diviſion : But as diviſion has not been yet taught, let that which before was the multiplicand, be made the multiplier, and the contrary, and if the product be the ſame, you may conclude the work is right.

* * *

SIMPLE DIVISION.

DEFINITION.

DIVISION ~~is the ſeparation or parting of any number or quantity given, into any parts aſſigned ; ſo~~ is ~~it likewiſe~~, a ſhort way of performing ſeveral ſubtractions.

In this rule are four parts, *viz.* 1. The Dividend. 2. The Diviſor. 3. The Quotient. 4. The Remainder.

RULE.

I. When the diviſor is leſs than 12, conſider how often the given figure in the diviſor is contained in the firſt or two firſt figures of the dividend, ſet it down, and the remainder count as many tens, then carry it to the ſecond, and if any thing remains carry it to the third, and ſo on till the whole be finiſhed.

II. If above 12, multiply it by the quotient figure, and ſubtract the product from the ſaid dividend, and to the remainder annex the next figure of the dividend, and proceed thus till there are no more figures in the given dividend, and the work is done.

Diviſor 2)47621 3)41768

Quotient 23810 : 1 Remainder. 13922 : 2

5)47161 6)214715 11)458716

Divid.
Diviſ. 24)42716(1779 Quot.
24
187
168
191
168
236
216
er 20

3. Method.
24)42716(1779
18930
122

Or thus.
24)42716(1779
187
191
236
20

4. Method.
4)42716
6)10679
Rem.
1779 : 5 X 4 = 20
Proof

Proof by Addition.		Proof by Multiplication.
24		1779
168	Or thus.	24
168	1779 + 20	———
216	6	7116
20	———	3558
———	10674	20 Rem.
42716	4	———
———	———	42716
	42716	———
	———	

21)47147(
124)206402(
109)1029876(
4710)524079(

8421)8765432(
4206)271980(
94071)29876432(
64207)298007400(

The **Demonstration** is very evident (eſpecially as it is the reverſe of multiplication) that any number being ſeparated, or reſolved in parts, and theſe parts ſingly divided by any number, the ſum of theſe quotients is equal to the true quotient of the whole divided by the ſame diviſor : For as the parts conſtitute the whole, ſo obvious as oft as the diviſor may be found in all its parts, ſo oft it is contained in the whole.

Proof. Multiply the quotient by the diviſor, adding the remainder, if any, and the product will be the ſame it is with the dividend. Or, add the remainder, if any, and all the lower lines together, in order as they ſtand, and their ſum will be the ſame as the dividend.

COMPOUND ADDITION.

DEFINITION.

COmpound Addition is the adding of ſeveral numbers together having divers denominations.

RULE.

Collect all the units of one ſpecies together, and then for every number of thoſe units which make one of the next ſpecies, you add one to the next column, ſetting down the remainder; in like manner proceed with every column till the whole is done.

I. MONEY.

4 Farthings make 1 Penny,
12 Pence — 1 Shilling,
20 Shillings — 1 Pound ſterling.

PENCE-TABLES.

d		*s*	*d*	*d*		*s*
20	is	1	8	12	is	1
30	—	2	6	24	—	2
40	—	3	4	36	—	3
50	—	4	2	48	—	4
60	—	5	—	60	—	5
70	—	5	10	72	—	6
80	—	6	8	84	—	7
90	—	7	6	96	—	8
100	—	8	4	108	—	9
110	—	9	2	120	—	10
120	—	10	—			

EXAMPLES.

£	*s*	*d*	£	*s*	*d*	£	*s*	*d*
417	10	$4\frac{1}{2}$	214	10	$4\frac{1}{2}$	714	15	$4\frac{1}{4}$
214	11	$2\frac{1}{4}$	149	15	$8\frac{3}{4}$	198	11	$2\frac{1}{2}$
170	—	$7\frac{1}{2}$	145	—	—	158	15	—$\frac{3}{4}$
162	11	$2\frac{1}{4}$	168	11	$7\frac{1}{4}$	146	17	5
141	—	—	129	10	$5\frac{1}{2}$	114	19	$4\frac{1}{4}$
1105	13	$4\frac{1}{2}$						

II. AVOIRDUPOIS WEIGHT.

16 Drams / ~~make~~ → 1 Ounce,
16 Ounces / → 1 Pound,
28 Pounds / → 1 Quarter,
4 Quarters / → 1 Hundredweight,
20 Hundredweight / → 1 Ton.

112 lb — 1 Cwt

By this weight are weighed all things of a coarſe or droſſy nature, ſuch as grocery, and chandler's wares, and all metals except gold and ſilver.

C.	q.	lb.	lb.	oz.	dr.	T.	C.	q.
417	2	14	141	10	14	172	14	2
214	1	15	714	11	12	714	12	3
214	2	17	162	10	13	621	—	2
174	—	11	172	11	—	427	17	1
425	1	17	162	—	11	176	14	—
1446	—	18						

III. TROY WEIGHT.

24 Grains make 1 Pennyweight,
20 Pennyweights — 1 Ounce,
12 Ounces — 1 Pound Troy.

By this weight are weighed jewels, gold, ſilver, corn, bread, and all liquors.

lb.	oz.	dw.	lb.	oz.	dw.	oz.	dw.	gr.
414	4	14	210	2	13	514	11	14
121	2	15	121	2	15	142	0	10
412	—	—	714	10	15	167	15	19
141	1	17	141	14	—	512	17	—
521	3	—	141	11	14	514	11	14
1610	—	6						

IV. CLOTH MEASURE.

2¼ Inches make 1 Nail,
4 Nails — 1 Quarter,
4 Quarters — 1 Yard,
3 Ditto — 1 Ell Flemiſh,
5 Ditto — 1 Ell Engliſh.

Yds.

John

Yds.	q.	N.	Ell E.	q.	N.	Ell F.	q.	N.
214	2	1	271	2	1	417	1	2
141	1	2	171	—	—	210	2	1
610	3	3	512	1	3	141	1	—
214	—	—	172	2	1	172	2	1
162	2	2	167	1	2	141	1	2
1343	2	—						

V. LAND MEASURE.

9 Square feet make 1 Yard,
30¼ Yards — 1 Pole,
40 Poles in length and 1 in breadth — 1 Rood,
4 Roods — 1 Acre,
640 Acres — 1 Mile. 09.—

A.	R.	P.	A.	R.	P.	A.	R.	P.
410	1	20	214	2	11	214	2	17
210	2	15	171	—	—	172	1	12
612	—	—	514	1	15	172	—	—
210	1	14	214	—	14	621	2	15
614	—	17	141	2	12	172	1	—
2057	1	26						

VI. LONG MEASURE.

3 Barley Corns make 1 Inch,
12 Inches — 1 Foot,
3 Feet — 1 Yard,
5½ ~~Yards~~ or 7 yds — 1 Rod, Pole or Perch,
40 Poles, &c. — 1 Furlong,
8 Furlongs — 1 Engliſh Mile.

Note. 4 Inches make 1 Hand; 6 Feet 1 Fathom; and 3 Miles 1 League. A Degree is 69½ Miles, tho' commonly reckoned but 60 Miles.

M.	F.	P.	Yds.	F.	I.	Leag.	M.	F.
214	5	21	214	2	10	417	2	4
142	4	19	141	1	10	214	1	5
220	2	14	121	—	—	214	2	3
310	—	—	417	2	11	141	—	—
140	2	15	172	1	11	141	1	6
1027	6	29						

VII. DRY MEASURE.

2 Pints make 1 Quart,
~~2 Quarts — 1 Pottle,~~
~~2 Pottles — 1 Gallon,~~
2 Gallons — 1 Peck,
4 Pecks — 1 Buſhel,
8 Buſhels — 1 Quarter,
36 Ditto — 1 Chaldron.

By this table is meaſured all dry goods, ſuch as coals, ſand, ſalt, fruit, wheat, barley, &c.

B.	P.	G.	Q.	B.	P.	C.	B.	P.
214	2	1	214	5	2	417	11	1
212	3	1	141	6	3	214	15	2
372	2	—	171	2	—	141	12	—
142	3	1	141	5	2	114	14	1
214	2	—	214	3	1	171	11	—
1157	1	1						

VIII. WINE MEASURE.

2 Pints make 1 Quart,
4 Quarts — 1 Gallon,
10 Gallons — 1 Anchor,
31½ Ditto — 1 Barrel,
42 Ditto — 1 Tierce,
63 Ditto — 1 Hogſhead,
84 Ditto — 1 Puncheon,
2 Hogſheads — 1 Pipe or Butt,
2 Pipes — 1 Tun.

By this meaſure, wines, brandies, ſpirits, perry, cyder, mead, vinegar, oil, and honey are meaſured.

Hhd.	G.	Q.	Pun.	G.	Q.	B.	Hhd.	G.
214	14	1	214	11	1	214	1	11
214	11	2	141	14	2	171	1	14
141	17	3	171	17	—	151	—	15
614	—	—	162	16	1	621	1	12
512	14	1	214	11	1	214	1	11
1695	57	3						

is the

IX. ALE and BEER MEASURE.

2 Pints	make	1	Quart,
4 Quarts	——	1	Gallon,
8 Gallons	——	1	Firkin of Ale,
9 Ditto	——	1	Ditto Beer,
2 Firkins	——	1	Kilderkin,
2 Kilderkins	——	1	Barrel,
1½ Barrel, or 54 Gallons	——	1	Hogſhead of Beer.
3 Barrels, or 2 Hhds.		1	Butt.

B.	Hhd.	G.	Butt.	B.	G.	Hhd.	G.	P.
214	1	14	214	2	11	514	11	2
141	—	15	141	2	15	141	—	5
214	1	12	121	1	15	152	14	2
621	1	15	141	1	—	141	15	1
214	—	12	175	—	14	214	11	—
1406	—	14						

X. TIME.

60 Seconds	make	1	Minute,
60 Minutes	——	1	Hour,
24 Hours	——	1	Natural Day,
7 Days	——	1	Week,
4 Weeks	——	1	Month,
13 Months, 1 Day, and 6 Hours	——	1	Julian Year.

Years.	Mon.	W.	Y.	M.	D.	D.	H.	M.
214	10	1	417	11	14	214	11	14
142	11	2	146	10	15	171	15	17
161	10	—	151	—	12	161	—	12
612	1	3	141	10	—	141	17	—
614	10	1	417	11	14	214	11	14
1746	4	3						

XI. MOTION.

60 Seconds	make	1 Prime Minute,
60 Minutes	—	1 Degree,
30 Degrees	—	1 Sign,
12 Signs	—	1 Great Circle of the Zodiac.

°	′	″	°	′	″	°	′	″
417	10	12	214	—	—	414	—	—
141	—	—	141	1	15	152	12	10
214	11	10	171	2	18	192	10	10
176	15	12	151	7	12	170	—	—
165	10	10	146	5	15	167	—	10
1113	46	44						

APPLICATION.

1. Suppoſe a perſon was born in 1708, when will he be fifty nine years old ? Anſw. [redacted]

2 A. borrowed of B. a certain ſum of money, and paid in part 20 guineas, and left unpaid 34*l*. 15*s*. 6*d*. the queſtion is to know what ſum was borrowed ? Anſw. £[redacted]

3. A. B. and C. purchaſed an houſe, A. paid fifty guineas, B. a bank note of 30*l*. and C. in ready caſh, 20*l*. 10*s*. what did the houſe coſt ? Anſw. [redacted]

4. Bought ſundry goods, for which I paid 34*l*. 11*s*. 4*d*. for packing, 15*s*. 6*d*. carriage, 1*l*. 7*s*. and other expences to the amount of 14*s*. 11*d*. ½, what do theſe goods amount to ? Anſw. £[redacted]

5. There is owing me from ſeveral the following ſums, *viz.* 20*l.* 15*s.* 6*d.* 18 guineas and an half; 19*l.* 14*s.* 2*d.* and 32*l.* 11*s.* 4*d.* what is the amount of the whole?
Anſw. [redacted]

6. A merchant imported 25 pipes of claret, 14 pipes of red port, 15 pipes of mountain, 16 pipes of Liſbon, and 23 pipes of Madeira; what quantity of wines was imported? Anſw. [redacted]

7. A ſurveyor having meaſured 6 pieces of land, finds two of them to contain each 16 acres, 2 roods, and 11 poles; another 15 acres and 1 rood; and in 3 others each contained 5 acres, 2 roods, and 10 poles; how many acres were ſurveyed? Anſw. 65 acres and 12 poles.

8. A factor bought 6 bags of hops, the firſt, N° 1, weighed C2. 1q. 14lb. N° 2 and 3, C5. 3q 2lb. and N° 4, 5, and 6, each C2. 1q. 7lb. what was the total weight? Anſw. C15. 0q. 9lb.

9. A merchant paid off ſundry bills to the amount of 314*l.* 11*s.* 4*d.* and had remaining 142*l.* 11*s.* 4*d.* I demand the ſum he firſt had? Anſw. £457. 2*s.* 8*d.*

10. A gentleman by will left his eldeſt ſon 1400*l.* more than the youngeſt, and his fortune was 767*l.* I demand the eldeſt ſon's fortune, and the total ſum left them by the father?

Anſw. Eldeſt ſon's fortune, £2167. total £2934.

COMPOUND SUBTRACTION.

DEFINITION.

COmpound Subtraction produces a difference between any two numbers of divers denominations.

RULE.

Begin with the leaſt denomination, and ſubtract the figure or figures in that place from the figure or figures that ſtand over them of the ſame denomination, ſetting down the remainder: But if the lower figure be greater than that above it, you muſt encreaſe the upper figure, by adding to it one of the next ſuperior denomination, and from that ſum ſubtract. In like manner to the next ſuperior, carrying one, as in integers or whole numbers.

I. MONEY.

	£.	s.	d.	£.	s.	d.	£.	s.	d.
From	421	11	4½	214	14	2	417	15	7½
Take	276	15	—¾	107	15	9	199	17	2¾
Diff.	144	16	3¾						
Proof	421	11	4½						

	£.	s.	d.		£.	s.	d.
Borrowed	1000	—	—	Lent	500	—	—
Paid at ſundry times	124	11	4½	Received at ſundry times	14	11	4½
	142	14	2¼		17	14	—
	50	10	4½		10	10	—
	70	11	3¼		30	14	4½
	10	10	—		11	11	—
Paid in all	398	17	2½	Received in all			
Unpaid	601	2	9½	Remains due			
Proof	1000	—	—	Proof			

II. AVOIRDUPOIS.

C.	q.	lb.	C.	q.	lb.	lb.	oz.	dr.
412	2	14	217	1	17	511	11	10
141	1	17	172	2	18	107	11	15
271	—	25						

III. TROY.

lb.	oz.	dw.	lb.	oz.	dw.	oz.	dw.	gr.
714	5	14	621	4	12	211	12	15
621	6	15	310	3	15	141	13	16
92	10	19						

IV. CLOTH MEASURE.

Yds.	q.	n.	Ell E.	q.	n.	Ell F.	q.	n.
214	2	1	411	2	1	476	2	1
141	3	2	141	4	2	141	2	3
72	2	3						

V. LONG MEASURE.

M.	F.	P.	Yds.	F.	In.	Lea.	M.	F.
427	5	14	214	2	10	417	2	4
146	6	15	101	—	11	141	2	7
280	6	39						

VI. LAND MEASURE.

A.	R.	P.	A.	R.	P.	A.	R.	P.
472	1	14	521	2	14	714	2	19
241	2	19	179	1	15	149	—	—
230	2	35						

VII. DRY MEASURE.

Ch.	B.	P.	B.	P.	G.	Q.	B.	P.
421	15	2	417	2	1	714	3	2
179	16	1	108	2	2	146	5	3
241	35	1						

VIII. LIQUID MEASURE.

Pun.	G.	Q.	P.	H.	Q.	Hhd.	G.	Pts.
721	11	2	417	1	13	214	11	4
145	—	—	149	1	15	114	15	5
576	11	2						

IX. TIME.

Yrs.	Mo.	W.	Yrs.	Mo.	D.	H.	M.	Sec.
428	10	2	821	11	14	421	15	16
149	—	3	141	9	—	171	15	19
279	9	3						

X. MOTION.

°	′	″	°	′	″	°	′	″
417	12	11	214	14	10	714	15	19
142	10	50	119	19	15	146	16	21
275	1	21						

APPLICATION.

1. King Edward the ſixth died A. D. 1553, I demand how many years have elapſed, this being A. D. 1769?
Anſw. 216 years.

2. What number is that which being added to 2142 increaſes the ſaid number to 10000? Anſw. 7858.

3. How many pounds, ſhillings, and pence, will augment fifty guineas and an half to 100*l*?
Anſw. £46. 19*s*. 6*d*,

4. Suppoſe this preſent year 1769 maſter Rupert Atkinſon was 11 years old, pray what year was he born in?
Anſw. 1758.

5. I deſire to know the difference in years between queen Elizabeth, born in 1533, and queen Ann, born in the year of our Lord 1665? Anſw. 132 years.

6. A. borrowed of B. 55*l*. 15*s*. 6*d*. and paid him in part 20 guineas, what remains unpaid?
Anſw. £34. 15*s*. 6*d*.

7. A. B. and C. purchaſed an houſe for 103*l*. A. and B. paid 82*l*. 10*s*. what did C. pay? Anſw. £20. 10*s*.

8. A gentleman by will gave his two ſons 2934*l*. the youngeſt ſon received 767*l*. I demand the elder ſon's fortune? Anſw. £2167.

9. A collector received 1420*l.* 10*s.* 4½*d.* and remitted at three ſeveral times 450*l.* and at two other periods 200 guineas; what has he ſtill in hand?

Anſw. £760. 10*s.* 4½*d.*

10. What ſum is that when taken from 100*l.* leaves 32*l.* 11*s.* 6*d*? Anſw. £67. 8*s* 6*d.*

11. What ſum is that to which if I add 67*l.* 8*s.* 6*d.* the amount will be 100*l*? Anſw. £32. 11*s.* 6*d.*

12. Suppoſe that from London to Bath (by way of Newbury) is 104 miles, and that from London to Newbury is 57 miles: how many miles are between Newbury and Bath? Anſw. 47 miles.

COMPOUND MULTIPLICATION.

DEFINITION.

COmpound Multiplication is the finding of a number which ſhall contain a given compound number any propoſed number of times.

RULE.

I. When the multiplier is not above 12.—Multiply the loweſt denomination by the given multiplier, divide the product by as many of the loweſt denomination as make one of the next ſuperior, ſetting down the exceſs, if any, and carry the quotient to the product of the multiplier: or in other words carry the *ones* to the next ſuperior denomination, and proceed as before.

II. If the given quantity be above 12.—Multiply by any two numbers (or more if neceſſary) whoſe product is equal to the given quantity. If your numbers be leſs than the given quantity, as in ſome caſes it unavoidably happens, add ſo many times the price as the remainder requires: if more, ſubtract the exceſs above the given quantity.

APPLICATION.

I. MONEY.

	£.	s.	d.	
1. Multiply	2	10	2½	by 5
			5	
	£ 12	11	—½	Anſwer

2. What will 15 yards of ſilk coſt, at 5*s*. 6*d*. *per* yard?

s. *d*.	or thus:	3. Method.
5 6	5*s*. 6*d*.	15 yards
5	3	5*s*. 6*d*.
1 7 6 = 5 yds.	16 6 = 3 yds.	3 15
3	5	6½*d*. -- 7 6
£.4 2 6 = 15 yds.	4 2 6 = 15 yds.	4 2 6

3. At 11 *s*. 6 *d*. *per* ell, what will 24 ells coſt?

	2. method.	3. method.
6	11 6	11 6
3 9 —	4	8
4	2 6 —	4 12 —
£ 13 16 —	6	3
	£ 13 16 —	£ 13 16 —

4. Method.	5. Method.	6. Method.
11 6	24	11 6
12	11 6	5
6 18 —	264	2 17 6 = 5
2	*d*. 6—½ 12	5
£13 16 —	2,0)27,6	14 7 6 = 25 } ſub.
	£ 13 16	11 6 = 1 }
		£ 13 16 — = 24 ells.

4. What will 49 lottery tickets, each 12*l.* 10*s.* 6*d.* coſt ?

£.	s.	d.	
12	10	6	
		8	
100	4	—	= 8
		6	
601	4	—	= 48 } add
12	10	6	= 1 }
£613	14	6	= 49

£.	s.	d.	
12	10	6	
		10	
125	5	—	= 10
		5	
626	5	—	= 50 } ſub.
12	10	6	= 1 }
£613	14	6	= 49

3. Method.

£.	s.	d.
12	10	6
		7
87	13	6
		7
£613	14	6

5. What muſt be paid for 1 Cwt. of tea, at 17*s.* *per* lb [illegible]

17*s.*		
	7	
5	19	= 7
	4	
23	16	= 28
	4	
£95	4	= 112

2. Method.

17*s.*		
8		
6	16	= 8
	7	
47	12	= 56
	2	
£95	4	= 112

3. Metho[illegible]

17*s.*
17
17
17
2,0)190,4
£95 4

		£.	s.	d.
6. What is the product of 2*l.* 14*s.* 2½*d.* multiplied by 9 ?	Anſw.	24	7	10½
7. If 1 ell of dowlas coſt 2*s.* 9½*d.* what coſt 14 ells ?	Anſw.	1	19	1

8. How

		£.	*s.*	*d.*
8. How much is 17 dollars, each 4*s.* 6*d* ?	Anſw.	3	16	6
9. Multiply 2*l.* 4*s.* 2½*d* by 25 ?	Anſw.	55	5	2½
10. At 4*s.* 6½*d.* per gallon, what coſt 33 gallons ?	Anſw.	7	9	10½
11. It is required to know what an officer's pay amounts to for 6 weeks, at 5*s.* 3*d.* per day ?	Anſw.	11	—	6
12. How much is 56 times 2*l.* 11*s.* 6*d* ?	Anſw.	144	4	—
13. In 2 pieces of cloth, each 42 yards, I demand the price, at 15*s.* 6*d.* per yard ?	Anſw.	65	2	—
14. What is the price of 7½ dozen pair of ſhoes, at 7*s.* 6*d.* per dozen ?	Anſw.	33	15	—
15. What coſt 100 ounces of ſilver, at 6*s.* 3½*d.* per oz.	Anſw.	31	9	2
16. What is the value of 300 french dollars, each 4*s.* 6*d* ?	Anſw.	67	10	—

II. WEIGHT.

17. What is the weight of 15 ſilver tankards, each weighing 3lb. 4oz. 10dw. 10gr ?

	lb.	oz.	dw.	gr.	
	3	4	10	10	
				5	
	16	10	12	2	
				3	
lb	50	7	16	6	Anſwer.

18. In 500 ſilver ſnuff-boxes, each 4 oz. 10dw. 10gr. how many oz ?

	4	10	10	
			10	
	45	4	4	= 10
			10	
	452	1	16	= 100
			5	
oz.	2260	8	8	= 500

19. How much is 8 times 10dw. 11gr.?
Anſw. 4oz. 3dw. 16 gr.

20. What is the weight of 22 ſilver ſpoons, each 3oz. 10dw. 5gr.? —— Anſw. 77oz. 4dw. 14gr.

21. What is the weight of 36 parcels, each 10lb. 10oz. 4dw.? Anſw. 390lb. 7oz. 4dw.

22. What is the weight of 21 hogſheads of tobacco, each weighing C17. 2qrs. 10lb.? Anſ. C369. 1qr. 14lb.

23. Multiply C21. 1qr. 11lb by 55.
Anſw. C1174. —qrs. 17lb.

24. There are 100 ſugar loaves each 25½lb. what is the weight of them? Anſw. C22. 3q. 2lb.

III. MEASURE.

25. Multiply 15 yds. 2 qrs. and 2 nails by 21.
Anſw. 328yds. —q. 2n.

26. How many ells Engliſh are contained in 11 pieces of cloth, each 25 ells, 2q. 1n.? Anſw. 279ells. 4q. 3n.

27. In 43 pieces, each 15 ells Fl. 3qrs. 1n. how many French ells (1 ell F. = 6qrs.) Anſw. 668ells. 1q. 3n.

28. Multiply 45 ells Fl. 1q. 2n. by 51.
Anſw. 2320ells. 1q. 2n.

29. Find how many buſhels are contained in 16 chaldron of coals? Anſw. 576 buſhels.

30. How many ſacks of coals are contained in 36 chaldron? —— Anſw. 432 ſacks.

31. How many gallons of wine are contained in 50 pipes? —— —— Anſw. 6300

32. In 100 degrees how many miles, allowing each degree 69½ miles? —— Anſw. 6950

33. I deſire to know how many days are contained in 23 years? —— Anſw. 8400 days 18 hours.

* * *

COMPOUND DIVISION.

DEFINITION.

COmpound Diviſion is when ſeveral numbers of divers denominations are given to be divided by one common diviſor.

RULE.

Divide the firſt denomination, and if any thing remains, multiply it by as many of the next inferior denomination, which makes one of its ſuperior, adding the dividend of that next denomination, divide this number in like manner, and ſo proceed till the whole be finiſhed. If the diviſor is above 12, find two or more numbers whoſe product when multiplied is equal to the given quantity. Divide the given price, weight, or meaſure, by one of theſe numbers, and divide that quotient by the others alternately, and the laſt quotient will be the anſwer. But if you cannot find two or more ſuch numbers, place the whole diviſor, and divide as in long diviſion of integers. If any remainder ſhould happen, multiply it by that number of the next inferior denomination, adding the product of what there is in the dividend of that ſpecies, divide the ſum in like manner, and ſo proceed to the loweſt denomination required.

EXAMPLES.

I. MONEY.

1. Divide £210. 10*s*. 6*d*. equally among 7 men, what is each man's ſhare?

7)210*l*. 10*s*. 6*d*.

£30 1*s*. 6*d*. Anſwer.

2. If 15 dollars are worth £3. 7*s*. 6*d*. what is one dollar worth?

5) 3 7 6
3)— 13 6
— 4 6 Anſwer.

3) 3 7 6
5) 1 2 6
— 4 6

+ 3. Divide £241. 10*s*. —½*d*. by 26.

26)241 10 —½(9*l*. 5*s*. 9¼*d*. Anſwer.

[illegible] Dixon Holton 2 [illegible] 1800

234
―――
7
20
―――
150
130
―――
20
12
―――
240
234
―――
6
4
―――
26
26
―――
0

PROOF.

9	5	9¼
		5
46	8	10¼
		5
232	4	3¼
9	5	9¼
£. 241	10	—½

[illegible]

	£	s.	d.
4. What is the quotient of £24. 7*s*. 10½*d*. divided by 9? ——— Anſw.	2	14	2½
+ 5. If 14 ells of dowlas coſt 1*l*. 19*s*. 1*d*. what coſt 1 ell? Anſw.	—	2	9½
6. If 17 dollars are valued at 3*l*. 16*s*. 6*d*. what is one worth? Anſw.	—	4	6
+ 7. If 25 pieces of money are worth 33*l*. 15*s*. what is the value of one of thoſe pieces? ——— Anſw.	1	7	—
8. What is the quotient of 225*l*. 16*s*. 9*d*. divided by 42? Anſw.	5	7	6½
+ 9. What was the price of one yard of cloth, when 56 yards ſold for 34*l*. 6*s*.? ——— Anſw.	—	12	3
10. If 8 dozen pair of gloves coſt 12*l*. what is that per pair? Anſw.	—	2	6

11. If 120 cwt. of ſugar coſt 336*l.* what coſt 1 cwt.? ——— Anſw. £. 2 s. 16 d. —

12. If 300 French dollars are worth 67*l.* 10*s.* what is one worth? Anſw. — 4 6

II. WEIGHT.

13. If 25 ſetts of caſtors weigh 1013 oz. 2 dw. 12 gr. what does 1 ſett weigh?

5) 1013 2 12

5) 202 12 12

40 10 12

14. Divide 4 oz. 3 dw. 16 gr. by 8.
Anſw. 10 dw. 11 gr.

15. If 12 ſilver ſpoons weigh 42 oz what is the weight of one ſpoon? ——— Anſw. 3 oz. 10 dw.

16. Divide 77 oz. 4 dw. 14 gr. by 22.
Anſw. 3 oz. 10 dw. 5 gr.

III. MEASURE.

17 Divide 328 yds. — q. 2 n. by 21.

7) 328 — 2

3) 46 3 2

yds. 15 2 2 Anſw.

18. If 40 pieces of cloth contain 985 yards, what does one piece contain? ——— Anſw. 24 yds. 2 q. 2 n.

19. If 50 pieces of dowlas contain 1250 ells Engliſh, what is the length of one piece? Anſw. 25 ells.

20. What is the quotient of 336 French ells divided by 96? ——— Anſw. 3 ells F. 3 q.

Multi-

Multiplication and Diviſion further applied; ordinarily called REDUCTION.

DEFINITION.

BY this application, two or more numbers of different denominations are brought into one denomination, but ſtill retaining the like value.

RULE.

I. By multiplication all great names are brought into ſmall, by multiplying with ſo many of the leſs as make one of the greater, this is called by ſome REDUCTION DESCENDING.

II. By diviſion all ſmall names are brought into great, by dividing with ſo many of the leſs as make one of the greater, and this is likewiſe termed REDUCTION ASCENDING.

EXAMPLE.

I. MONEY.

1. Reduce £21. 11*s*. 4½*d*. into ſhillings, pence, and farthings.

20

431 ſhillings
12

5176 pence
4

20706 farthings

Anſwer

2. In 20706 farthings how many pence, ſhillings and pounds?

4)20706
12)$5176\frac{1}{2}$
2,0)43,1 : 4
£21. 11*s*. $4\frac{1}{2}$*d*. Anſwer.

3. In £150. 10*s*. 6*d*. how many French crowns each 4*s*. 6*d*.

4*s*. 6*d*.
12
54

150*l*. 10*s*. 6*d*.
20
3010
12
54)36126(669 Anſwer.
324
372
324
486
486
0

Proof.
669
54 = 4*s*. 6d.
2676
3345
12)36126
2,0)301,0 : 6
£.150 10 6

3 method.
s.
4 = $\frac{1}{5}$ | 669
— 6*d*. = $\frac{1}{8}$ | 133 16
| 16 14 6
£.150 10 6

or thus:
669
4 : 6
2676
$\frac{1}{2}$ 334 : 6
2,0)301,0 : 6
£.150 : 10 : 6

4. How many crowns, half crowns, ſhillings, and ſixpences of each an equal number will diſcharge a debt of 150*l.* 10*s* ?

150 10 | 5*s.*
20 | 2 6
9)3010 | 1
$334\frac{4}{9}$ Anſwer. | — 6
9 —

5. Remitted from London to Amſterdam a bill of 580*l.* ſterling, how many pounds Flemiſh, is the ſum, the exchange at 33*s.* 4*d.* *per* £. ſterling.

580
400
12)232000
2,0)1933(3 : 4
Anſw. 966 : 13 : 4

33*s.* 4*d.*
12
400

or thus : 580
400
24,0)23200,0($966\frac{16}{24}$ Anſwer
160
160
$\frac{16}{24}$ or $\frac{2}{3}$ = 13*s.*4*d.*

3. method.
580
2
3)1160
$386\frac{2}{3}$
580
Anſw. $966\frac{2}{3}$

6. In 112*l.* 10*s.* $4\frac{1}{2}$*d.* how many farthings ?
Anſw. 108018

7. Reduce 21405 farthings into pounds.
Anſw. £22. 5*s.* $11\frac{1}{4}$*d.*

8. In 57 crowns how many ſixpences ? Anſw. 570

9. How many half crowns are there in 720 guineas ? Anſw. 6048

10. Reduce 120 moidores into pounds. Anſw. £.162

11. In 120*l.* 10*s.* how many moidores ? Anſw. 89$\frac{7}{27}$

12. In 1260 ducatoons, each 6*s.* how many guineas ? Anſw. 360

13. With how many ducatoons, each 6s. could I pay 360 guineas ? —— Anſw. 1260

14. There are 25 purſes, and in each purſe there are 5 guineas, 4 half ditto, and 10 crowns, how much ſterling is the ſum ? —— Anſw. £246. 5*s.*

15. A merchant has a certain quantity of French crowns of 4*s.* 6*d.* each, which he changes with a caſhier for 112*l.* 10*s.* I demand the number of crowns ? Anſw. 500.

II. WEIGHT.

16. Reduce C417. 2q. 11lb. into lbs.

1. Method.	2. Method.	3. Method.
417 : 2 : 11	417 : 2 : 11	417:67 lb. × 12
4	417	5004
	417	
1670	41767	46771
28		
	46771	
13371		
3340		

lbs. 46771 Anſwer

17. Reduce 47162 lbs. into Cwts. Anſw. C421. —q. 10lb.

18. Bought 5 ingots of ſilver, each containing 21lb. 10 oz. 10 dw. how many grains ? Anſw. 630000.

19. A ſilver tankard weighing 45 oz. 10 dw. is ordered to be made into ſpoons, each to weigh 3 oz. 10 dw. what will be the number ? —— Anſw. 13.

III. MEASURE.

20. In 214 yards how many nails?

```
 214
   4
----
 856 quarters
   4
----
3424 nails
```

21. In 401 yards how many nails? Anſw. 6416

22. Bought 410 ells Engliſh, how many yards? Anſw. $512\frac{1}{2}$

23. In 60 leagues how many yards? Anſw. 316800

24. Bought 20 butts of wine, how many gallons? Anſw. 2520

25. How many barley corns will reach round the world, which is 360 degrees, each degree $69\frac{1}{2}$ miles? Anſw. 4755801600

The reaſon of this application is manifeſt by its practice.

REMARK. Mr. Malcolm in his treatiſe of Arithmetic (which is undoubtedly the beſt in this or any other language) obſerves, that ſome reckon it the moſt natural order to teach the operations of fractions before they enter upon the rule of proportion; becauſe its theory is the ſame numbers integrally or fractionally expreſſed. Yet, ſays he, the operations in fractions being more perplexed, would be very unfit examples for explaining proportion; nor are they uſed for that purpoſe. Proportion concerns numbers abſtractly, and therefore 'tis enough to have it explained by integral expreſſions; beſides the knowledge of fractional operations, can help us nothing to the underſtanding of proportion.

PRO-

◆ ◆ ◆

The RULE of THREE, or PROPORTION, commonly called the GOLDEN RULE.

DEFINITION.

THIS rule is ſo called, becauſe by three numbers given we find a fourth, which bears ſuch a proportion to the third as the ſecond bears to the firſt, and conſequently, as the firſt is to the ſecond, ſo is the third to the fourth.

Sometimes by way of pre-eminence it is called the GOLDEN RULE, from its extraordinary uſefulneſs, not only in ARITHMETICAL QUESTIONS, but in all parts of the MATHEMATICS.

RULE.

I. When three numbers are given, two of theſe numbers are of one denomination, viz. either money, weight or meaſure, and are therefore the firſt and third numbers; and the other of courſe muſt be placed in the middle, which will be of the ſame name as the anſwer.

II. When according to the true meaning and deſign of the queſtion, more requires more or leſs requires leſs, ~~multiply the ſecond number by the third (when the firſt and third are brought into one name and the ſecond to the loweſt denomination mentioned) and divide their product by the firſt, the quotient will give the anſwer in the ſame denomination as the ſecond number.~~ This is called DIRECT PROPORTION.

III. But if more requires leſs, or leſs requires more, ~~multiply the firſt and ſecond terms together (when duly prepared) and divide their product by the third term, and the quotient will be the anſwer.~~ This is called INVERSE PROPORTION.

N. B. The great utility as well as frequent uſe of this rule in the various practical affairs of life, and as a due knowledge

Rule direct.

State yr Question according to the Conditions thereof; change the first & third into one Name & the middle Number into the lowest

Name mentioned; multiply your second and third Terms together & divide by the first the Quotient is the Answer in the same Name as yr Midd. No is:

knowledge thereof is the foundation of all higher rules, and even the mathematics itſelf, I ſhall in the firſt place (for the better facilitating the operations through all its branches) ſubjoin the truth of this practical rule by the following eaſy and conciſe DEMONSTRATION

Any three numbers being propounded after a fourth proportion be found agreeable to the rule given under article II. If the work is right, the proportion will always hold as in the following example.

Let the three numbers be 2, 4, and 12.

1. then as $2 : 4 :: 12 : 24$
2. .... $2 : 12 :: 4 : 24$
3. .... $2 \times 24 = 4 \times 12$
4. .... $4 \div 2 = 24 \div 12$
5. .... $2 = 4 \times 12 \div 24$
6. .... $4 = 2 \times 24 \div 12$
7. ... $12 = 2 \times 24 \div 4$
8. ... $24 = 4 \times 12 \div 2$

Which is read thus :

1. As the firſt is to the ſecond, ſo is the third to the fourth.
2. As the 1ſt is to the 3d, ſo is 2d to the 4th.
3. The product of the 1ſt and 4th is equal to the product of the 2d and 3d. Or in other words, the product of the extreams are equal to the product of the means.
4. The 2d divided by the 1ſt, is equal to the 4th divided by the 3d.
5. The 1ſt is equal to the product of the 2d and 3d divided by the 4th.
6. The 2d is equal to the product of the 1ſt and 4th divided by the 3d.
7. The 3d is equal to the product of the 1ſt and 4th divided by the 2d.
8. The 4th is equal to the product of the 2d and 3d divided by the 1ſt.

Here you ſee this rule is perfectly demonſtrated by theſe two AXIOMS, viz.

Inverse. 1. The

Multiply your 1st & 2nd together & divide by the third.

1. The product of the means is equal to that of the two extremes.

2. If equal things be divided by equal things, the quotients will be equal.

N. B. Obſerve that in article II. the product of the firſt and fourth is equal to that of the ſecond and third ; but in article III. the product of the third and fourth is equal to that of the firſt and ſecond. From hence you have the following

DEMONSTRATION.

Let the example be as $6 : 4 : 3 : 8$

1. $6 \times 4 = 3 \times 8$

2. $24 = 3 \times 8$, $1 = 24 \div 8 = 3$

3. $24 \div 3 = 8$ therefore $8 =$ to the number required.

Which is read thus :

1. The product of the 2 firſt numbers, 6 multiplied by 4, is equal to that of 8 multiplied by 3.

2. If 24 be equal to 3 times 8, then it follows that once 8 is equal to 1 third part of 24.

3. One third part of 24 being 8, therefore the 4th number is equal to 8 which was required.

PROOF of ARTICLE II.

1. Multiply the 1ſt and 4th term together, and the 2d by the 3d, and if each multiplication produces the ſame product, the ſum is right. Thus $2 \times 24 = 48$ & $4 \times 12 = 48$.

2. Another proof may be made by inverting the operation thus :

$24 : 4 :: 12 : 2$

4

—

24)48(2 Anſwer.

48

—

0

3. It may be likewiſe proved by ſtating the queſtion thus :

12 : 2 : 24 : 4
2
—
12)48
—
4 Anſwer.
—

4. Alſo by ſtating it in this manner:
As 4 : 2 : : 24 : 12
2
—
4)48
—
12 Anſwer.
—

PROOF to ARTICLE III.

This may be proved by Article 2, in the following proportion:

1. As 3 : 4 : : 6 : 8
4
—
3)24
—
8
—

2. Or in this manner:
As 6 : 3 : : 8 to the 2d number.
3
—
6)24
—
4 2d number
—

3. It will prove alſo by multiplying the firſt and ſecond together, and in like manner the third and fourth; if each multiplication produces the ſame product the work is right.

For 6 × 4 = 24 ſo is 3 × 8 = 24.

1. If 1 yard of cloth coſt 4*s.* 6½*d.* what will 25 yards coſt at the ſame rate?

yard s. d. yards
1 : 4 „ 6½ :: 25
12
54
4
218
5
1090 = 5
5
4)5450 = 25
12)1362 „ 2
2,0)11,3 „ 6
£. 5 „ 13 „ 6½ Anſwer.

Proof by compd. multip.
4 „ 6½
5
1 „ 2 „ 8½
5
5 „ 13 „ 6½ Anſw.

2. Bought 25 yards of cloth for £. 5. 13*s.* 6½*d.* what did it coſt per yard?

yards. £. *s.* *d.* yard.
25 : 5 „ 13 „ 6½ :: 1
20
113
12
1362
4
5)5450
5)1090 = 5
4)218 = 25
12)54½
Anſwer 4 „ 6½.

Proof by compound diviſion.
5)5 : 13 : 6½
5)1 : 2 : 8½
— : 4 : 6½

3. If 3 yards of cambric coſt £. 1. 16*s*. 6*d*. what coſt 100 ells Engliſh?

	yards.	*s*. *d*.		ells.	
	3	36 ,, 6	: :	100	
	4	12		5	
qrs.	12	438 pence		500	qrs.
		500			

Firſt. No. 12)219000

12)18250 pence

2,0)152,0 — 10

£. 76 : — : 10 Anſwer.

PROOF.

By multiplying the firſt and fourth together, and the ſecond by the third.

£.	*s*.	*d*.	
76 :	— :	10	4th term.
		12	1ſt term.
£. 912 :	10 :	—	

£.	*s*.	*d*.		
1 :	16 :	6		2nd term.
		10		
18 :	5 :	—	=	10
		10		
182 :	10 :	—	=	100
		5		
£. 912 :	10 :	—	=	500 3d term.

4. If 100 ells Engliſh coſt £. 76. —*s*. 10*d*. what coſt 3 yards?

ells. £. s. d. yards.
100 : 76 : — : 10 : : 3
5 20 4
500 1520 12
12
18250
1ſt No. 12 the third number.
5,00)2190,00
12)438
2,0)3,6 : 6
£. 1 : 16 : 6 Anſwer.

PROOF.

£. s. d. yards. £. s. d.
1 : 16 : 6 : 3 : 76 : — : 10
438 pence 18250 pence.
3
438)54750(125yds= 100 ells Engliſh.
1095
2190
0

5. If I buy 100 ells of cambric for £. 76. —*s.* 10*d.* how many yards I have for 36*s.* 6*d.* at an equal rate?

	£.	*s.*	*d.*	qrs.		*s.*	*d.*
—	76 :	— :	10 :	500 :	:	36 :	6

76 : — : 10 : : 500 : : 36 : 6

20   12

1520   438

12   500

qrs.

18250   18250)219000(12 = 3 yds.

3650

. . 0

6. What is the intereſt of £. 240. for a year, at 4 per cent per ann?

£.   £.   £.   £.

1,00 : 4 : : 240   Or thus: 240

4   4

9,60   £. 9,60

20   20

Anſwer £. 9 : 12 : —   12,00   S. 12,00

7. A Gentleman left his daughter £. 500. to be paid her when ſhe attained her age of 21 years, with intereſt at 5 per cent. Now it remained in the hands of the executors but 250 days, what had ſhe to receive in the whole;

£.
500
5 per cent.

£. 25,00

days. £. days.
Then if 365 : 25 : : 250
5
1250 } ||2
5
£. s. d.
365)6250($17 : 2 : 5\frac{1}{2}$
2600
45
20
)900(2
170
12
)2040(5
215
4
)860($\frac{1}{2}$
130

	£.
Principal	500
Intereſt	$17 : 2 : 5\frac{1}{2}$
Anſwer	£. $517 : 2 : 5\frac{1}{2}$

8. How much ready money for a note of £. 20. due 15 months hence at 5 per cent?

months £. months.
12 : 5 : : 15
5
12)75
l. 6 : 5 :—

l. s. l. s. l.
106 : 5 : 6 : 5 : : 20
20 20 20
2125 125 400
400
s. d.
)46000 (23 : $6\frac{1}{4}$ Rebate.
7500
1125
12
13500
750
4
)3000(
875

l.
20 : — : — } ſub.
1 : 3 : $6\frac{1}{4}$ }
l.18 : 16 : $5\frac{3}{4}$ Anſw.

Or thus :

l. s. l. l.
106,, 5 : 100 : : 20× 80 *Crowns.*
4 80
l. s. d.
425)8000(18:16:$5\frac{1}{2}$
3750
350
20
)7000(
2750
200
12
)2400(
275
4
)1100(
250

9. P. owes

9. P. owes Q. 420*l.* which will be due 6 months hence; but P. is willing to pay 60*l.* now, provided he can have the reſt forborn a longer time. It is agreed on, the time of forbearance therefore is required?

£. M. £.
420 : 6 :: 360
6
———
36,0)252,0(7 Months. Anſwer.
———
0

420 } ſub.
60 }
———
360

10. A merchant has owing to him 450*l.* to be paid as follow: 75*l.* at 2 months, 150*l.* at 5 months, and the reſt at 8 months; and it is agreed to make one payment of the whole; I demand when that time muſt be?

75 × 2 = 150
150 × 5 = 750
225 × 8 = 1800
——— ———
45,0 ÷ 2700(6 months. Anſwer.
2700
———
0

N. B. In queſtions of this nature, you have only to multiply the ſum of each particular payment by the given time; add the ſeveral products together, and divide the ſum by the whole debt, and the quotient will produce its proper anſwer.

11. A. delivered 189 gallons of brandy, at 6*s.* 8*d.* per gallon, to B. for 126 lbs. of tea: What was the tea per lb.?

gal. *s.* *d.* gall.
1 : 6,,8 : : 189
12 80
80 15120 value of the brandy in pence.
126)15120(120*d.* = 10 ſhillings. Anſwer.
252
0

12. If a yard of cloth is bought for 13*s.* 4*d.* and ſold again for 16*s.* what is the gain per cent?

16*s.*
13,,4*d.*
2,,8

s *d.* *s.* *d.* £.
13,,4 : 2,,8 : : 100
12 12 240 pence = 1£.
160 32 24000
32
48000
72000
4,0)76800(0 = 40
4)19200
12)4800 = 160
2,0)40,0

Anſwer. 20 per cent.

13. If 50 yards of ſilk coſt 15*l.* what muſt one yard be ſold for to gain 10*l.* per cent ?

£. £. £. 10 × 5 = 50 yds.
1,00 : 15 :: 110
110
£. s.
10)16 ,, 10
16,50
20
5)1 ,, 13 —
10,00 Anſw. — 6 7⅕ = 1 yard.

14. If a yard of ſilk coſt 6*s.* and ſold again for 6*s.* 7⅕*d.* what is the gain per cent ?

s. d. s. d. £.
6 ,, 7⅕ 6 : 7⅕ :: 100
6 ,, — 5 20
— ,, 7⅕ 36 2000
36
5
5)72000
6)14400
12)2400
2,0)20,0

Anſw. £. 10 per cent.

15. If a parcel of ſilk be ſold for 16*l.* 10*s.* and at 10 per cent gain, what was the prime coſt ?

£. £. s. £.
110 : 16 10 :: 100
16 ,, 10
1600
10*s.* — ½ -- 50
11,0)165,0

£. 15 Anſwer.

16. A dealer became a bankrupt for 5000*l.* but he gave up all his effects to his creditors, which amounted to 3750*l.* how much then muſt each creditor receive in the pound ?

£. : £. :: £.
5,000 : 3750 :: 1
20
)75,000
15 ſhillings Anſw.

PROOF.
5000
15
2,0)7500,0
£. 3750

17. Meſſrs. F. and G. enter partnerſhip ; F. puts in 50*l.* for 3 months, and G. 70*l.* for 5 months ; and they gained 30*l.* what is each man's ſhare of the gain ?

£.
50 × 3 = 150
70 × 5 = 350

£.
5,00 : 30 :: 150
150
5,00) 45,00
£. 9 F.'s ſhare.

£. : £. :: £.
5,00 : 30 :: 350
30
5,00)105,00
£. 21 G's ſhare

PROOF.
£.
F's — 9
G's — 21
£. 30 whole gain.

N. B. The reaſon of multiplying the ſtocks and times is, that if the ſtocks and times are all equal, the gains are all equal, and we have only to divide the gain by the number of partners ; but if the times are only equal, it is plain, the ſhares of the gain are proportional to the ſimple ſtocks ; If the ſtocks are equal, theſe ſhares are proportional to the unequal times ; and conſequently both being unequal, the ſhare muſt be proportioned to both multiplied together.

18. A merchant at Italy remits to his correſpondent in London 270 pieces of eight, at 56*d.* per piece, what was the value in £'s ſterling ?

```
P.   d.     P.
1 : 56 :: 270
            56
          ----
          1620
          1350
          ----
     12)15120
     --------
     2,0)126,0
         -----
         £.63 Anſwer.
```

19. If beans at 5*s.* per buſhel were to be mixed with the like quantity of oats at 3*s.* 6*d.* per buſhel, I demand the price of a buſhel of this mixture ?

```
1 × 5   = 5s.
1 × 3:6 = 3 : 6
-         -----
2   ÷     8 : 6
          -----
Anſwer    4 : 3 per buſhel
          -----
```

20. A ſchoolmaſter being aſked how many ſcholars he had, ſaid, if the third, fourth, and ſixth of them were added together, they would make 72, how many had he ?

Suppoſe 192

$\frac{1}{3}$ — 64
$\frac{1}{4}$ — 48
$\frac{1}{6}$ — 32

144 : 192 :: 72
72

384
1344

144)13824(96 Anſwer.

864

0

Suppoſe 24

$\frac{1}{3}$ — 8
$\frac{1}{4}$ — 6
$\frac{1}{6}$ — 4

18 : 24 :: 72
24

288
144

18)1728(96 Anſwer.

108

0

N. B. From theſe examples it is evident that Intereſt Rebate, and Diſcount, Equation of Payments, Loſs and Gain, Fellowſhip, Exchange, &c. are but ſo many branches of the Rule of Proportion : Why then ſhould the young tyro be puzzled with thoſe diſtinctions branched out into ſo many pages of tedious rules and inſtructions, when the examples here given will ſufficiently enable him to ſolve any queſtion relating to buſineſs, or any of the abovementioned branches of proportion.

21. What coſt 917 yards of ſilk at 5*s.* 9*d.* per yard?
Anſw. £263. 12*s.* 9*d.*

22. If 1 buſhel of barley coſt 3*s.* 5*d.* what coſt 107 buſhels ? ——— Anſw. £18. 5*s.* 7*d.*

23. Bought 717 gallons of rum for 301*l* 14*s.* 9*d.* what is that per gallon ? ——— Anſw. 8*s.* 5*d.*

24. Sold 117 ells of holland for 54*l.* 2*s.* 3*d.* what is that per ell ? ——— Anſw. 9*s.* 3*d.*

25. If 1 pair of ſhoes coſt 6*s.* 9*d.* what coſt 173 pair ?
Anſw. £58. 7*s.* 9*d.*

26. What coſt 131 yards of cambric, at 12*s.* 7*d.* per yard ? ——— Anſw. £82. 8*s.* 5*d.*

27. If Port wine be ſold at 17*s.* 10*d.* per doz. what muſt I give for 373 doz ? Anſw. £332. 11*s.* 10*d.*

28. Bought 907 dozen of claret for 1927*l.* 7*s.* 6*d.* what did it coſt per doz ? Anſw. £2. 2*s.* 6*d.*

29. At 11*s.* 6*d.* per ell what will 24 ells coſt ?
Anſw. £13. 16*s.*

30. If a lottery ticket be ſold for 12*l.* 10*s.* 6*d.* what is the value of 49 tickets at the ſame rate ?
Anſw. £613. 14*s.* 6*d.*

31. If 1 cwt. of tea be ſold for 95*l.* 4*s.* what is that per lb ? ——— Anſw. 17*s.*

32. If an officer's pay be 5*s.* 3*d.* per day, what is he to receive for 6 weeks ? ——— Anſw. 11*l.* —*s.* 6*d.*

33. If 162½ yards of cloth coſt 50*l.* 7*s.* 6*d.* what is 1 ell Engliſh worth ? ——— Anſw. 7*s.* 9*d.*

34. What coſt 100 oz. of ſilver at 6*s.* 3½*d.* per oz ?
£31. 9*s.* 2*d.*

35. If 4*s.* 9*d.* purchaſe 1 yard of any thing, how many yards will 41*l.* 11*s.* 3*d.* buy ? Anſw. 175 yards.

36. A gentleman has an eſtate which brings him in 1000*l.* per annum, and the expences he is at, one day with another, for houſekeeping, &c. is 2*l.* 17*s.* 6*d.* I demand what he loſes or ſaves in the year ?
Anſw. £49. 7*s.* 6*d.* loſs.

37. Bought a quantity of green tea which weighed 7 cwt. 3 qrs. 3lb. and gave 780*l.* 5*s.* 5*d.* for it, what is 3 lb. of it worth ? ——— Anſw. £2. 13*s.* 9*d.*

38. A draper bought 5 pieces of cambric, each piece containing 26 yards, and gave after the rate of 7*s.* 9*d.* per yard, what did they come to? Anſw. £50. 7*s.* 6*d.*

39. A goldſmith ſold a tankard for 6*l.* 4*s.* $9\frac{1}{5}$*d.* at the rate of 6*s.* 4*d.* per ounce, what was the weight of it? Anſw. 1 lb. 7 oz. 14 dwts.

40. A woollen-draper bought 6 bales of cloth, each bale containing 12 pieces, and each piece 40 yards, and gave 7*l.* 10*s.* for every 10 yards one with another, what do they come to? ——— Anſw. £2160.

41. If a gentleman's yearly income be worth 1500*l.* what may he ſpend per day to lay up 300*l*? Anſw. £3. 5*s.* $9\frac{15}{365}$*d.*

42. Bought 3 bags of hops, which weighed as under,

	C.		q.		lb.
No. 1.	2	:	1	:	16
2.	1	:	3	:	12
3.	2	:	2	:	—

and gave after the rate of 4*l.* 15*s.* per cwt. what's the value thereof? ——— Anſw. £32. 1*s.* 3*d.*

43. If 120 cwt. of ſugar coſt 336*l.* what coſt 1 cwt? Anſw. £2. 16*s.*

44. There is a ſhip worth 3000*l.* of which I have the $\frac{5}{16}$ part, what is my part or ſhare worth? Anſw. £937. 10*s.*

45. This queſtion being the celebrated number, I deſire to know a POPULAR PATRIOT's daily ſtipend, ſuppoſing the ſum to be 1200*l.* per annum, with the addition of 6*s.* 8*d.* per day? Anſw. £3. 12*s.* $5\frac{3}{7}$*d.*

46 How many yards of ſhallon 3 qrs. wide, will line 20 yards of cloth, which is 5 qrs. wide?

5 : 20 : 3
5

3)100

Anſw. $33\frac{1}{3}$ yards.

47. How many pieces of money of 27*s.* value, are equal to 150 pieces of 21 Shillings? Anſw. $116\frac{18}{27}$

48. How many yards of matting, that is half a yard wide, will cover a room that is 22 feet wide and 50 feet long? ——— Anſw. 244 yds. $1\frac{1}{3}$ft.

49. If 100*l.* in twelve months, gain 5*l.* intereſt, what principle will gain the ſame in 9 months ?
Anſw. £133. 6*s.* 8*d.*

50. A perſon borrowed of me 100*l.* for 12 months, how long ought he to lend me 133*l.* 6*s.* 8*d.* to requite the kindneſs ? ——— Anſw. 9 months.

51. An army beſieging a town, in which were 10,000 Soldiers, with proviſion for 3 months, how many men muſt be diſcharged that the proviſion may laſt 5 months ?
Anſw. 4,000.

A FURTHER APPLICATION in Queſtions relating to

INTEREST.

~~DEFINITION~~.

Intereſt is money that ariſes from a certain ſum lent, or due at a limited time, according to a certain rate in the hundred pounds. The PRINCIPAL is the ſum lent ; the RATE *per cent.* is the ſum agreed on between the lender and the borrower ; and the AMOUNT is the Principal and Intereſt added together.

To Intereſt belong, commiſſion, brokage, purchaſing of ſtocks, inſurance, &c. See queſtions in this rule No. 6, 7, and 8.

52. What is the intereſt of 315*l.* for a year at 5 per cent. per annum ? ——— Anſw. £15. 15*s.*

53. What comes the intereſt of a bond of 87*l.* 13*s.* 9*d.* at $4\frac{1}{4}$ per cent. per annum ? Anſw. £3. 14*s.* $6\frac{1}{4}$*d.*

54. At $2\frac{3}{4}$ per cent. per annum, what is the annual intereſt of 187*l.* 15*s.* 8*d* ? Anſw. £5. 3*s.* $3\frac{1}{4}$*d.*

55. What is the commiſſion of a broker, for ſelling £750. ſtock, at 2*s.* 6*d.* or $\frac{1}{8}$, per cent ?
Anſw. 18*s.* 9*d.*

56. Find the commiſſion of an agent for buying goods to the amount of 570*l.* 10*s.* at $3\frac{1}{2}$ per cent ?
Anſw. £19. 19*s.* 4*d.*

57. What comes an aſſurance of 450*l.* 10*s.* 6*d.* at $2\frac{1}{2}$ per cent ? ——— ——— Anſw. £11. 5*s.* 3*d.*

58. Shipped at Leghorn, goods to the value of 1500*l.* 10*s.* 4½*d.* upon which an aſſurance is made at 10½ per cent. I demand what it comes to?

Anſw. £157. 11*s.* 1*d.*

59. What is the purchaſe of 870*l.* bank ſtock, at 132 per cent. —— —— Anſw. £1148. 8*s.*

60. What is the purchaſe of 747*l.* 10*s.* at 96 per cent?

Anſw. £717. 12*s.*

61. At 132 per cent, what is the purchaſe of 500*l.* India ſtock? Anſw. £660.

62. At 2½ per cent per annum, what is the intereſt of 420*l.* 10*s.* 6*d.* for 5 years? Anſw. £52. 11*s.* 3*d.*

63. What is the amount of 312*l.* 10*s.* at 4 per cent per annum for 6 years? Anſw. £387. 10*s.*

64. Find the intereſt of 837*l.* 17*s.* 9*d.* for 19 years 4 months, at 3 per cent per annum. Anſw. £485. 19*s.* 5*d.*

65. Sold goods to the value of 370*l.* 10*s.* to be paid in 6 months, what muſt be diſcounted for preſent payment at 2½ per cent? See queſtion 8.

Anſw. £4. 11*s.* 5¾*d.*

66. What is the preſent payment of 500*l.* payable in 9 months, at 4 per cent per annum?

Anſw. £485. 8*s.* 9*d.*

67. What is the diſcount of 100*l.* payable in 8 months, rebate at 3½ per cent? Anſw. £97. 14*s.* 5*d.*

68. What preſent money will pay a debt of 527*l.* 9*s.* 1*d.* due 7 months hence, allowing rebate at 4¼ per cent?

Anſw. £514. 13*s.* 10¾*d.*

For a further illuſtration of this rule, ſee PRACTICE. And for INTEREST UPON INTEREST, commonly called COMPOUND INTEREST, it is reſerved for Decimals.

II. EQUATION of PAYMENTS. See queſt. 9 and 10.

DEFINITION.

Equation of payments is when a certain ſum of money becomes due at different times, are reduced to one mean time for the payment of the whole, ſo that no loſs will be ſuſtained by either party.

69. A merchant buys goods to the value of 300*l.* on the following conditions, viz. half to be paid in 3 months and the remainder in 6 months. I demand the equated time to pay the whole at one payment ?

Anſw. 4 months 15 days (allowing 30 days to the month)

70. There is a legacy of 450*l.* to be paid as follow $\frac{1}{4}$ in 3 months, and the remainder in 5 months ; the parties agreeing upon a time for the payment of the whole, therefore the equated time is demanded ?

Anſw. 4 months 15 days.

71. A promiſes to pay B. 600*l.* of which is to be paid in 3 months 150*l.* in 5 months 200*l.* and in 9 months, 250*l.* afterwards having agreed on one payment, I require the equated time ? Anſw. 6 months and 5 days.

III. BARTER. See queſtions 11 and 12.

DEFINITION.

Barter is the exchanging of one commodity for another.

72. How much ſugar at 1*l.* 16*s.* 6*d.* per Cwt. muſt be given for a pipe of wine at 75*l.* 10*s.* value ?

Anſw. 41Cwt. 1qr. 13lb. 6oz.

73. How much tea at 10*s.* 6*d.* per lb. can I have in barter for 5 pieces of linen, each 25 yards, at 3*s.* 6*d.* per yard ? Anſw. 41$\frac{1}{2}$lbs.

74. Two merchants, A. and B. barter or exchange with one another in traffick : A. has ſilk which he ſells at 5*s.* 6*d.* per yard, but in barter he will have 6*s.* B. has rum at 9*s.* per gallon : Now the queſtion is, how much ought B. to advance his rum in barter, to equal the advance of A's ſilk ?

Anſw. B's rum in barter is worth 9*s.* 9$\frac{3}{4}$*d.* per gallon.

75. C. delivered 1 hhd. of brandy, at 7*s.* 6*d.* per gallon, to D. for 20 yds. of broad cloth, and in ready money 6*l.* 2*s.* 6*d.* what was the cloth per yard ?

Anſw. 17*s.* 6*d.*

IV. LOSS and GAIN.

See queſt. 12, 13, 14, 15.

76. Bought a pipe of wine for 40*l.* but by leakage I loſt 35 gallons, the remainder was ſold at 7*s.* 6*d.* per gall. what was the gain or loſs ? Anſw. £5. 17*s.* 6*d.* loſs.

77. Bought cloth at 15*s.* per yard, and ſold it again for 17*s.* 6*d.* what was the gain per cent ?

Anſw. £16. 13*s.* 4*d.*

78. If a parcel of cloth be ſold for 247*l.* 10*s.* at 10 per cent profit, what was the prime coſt. Anſw. £225.

79. If a bale of cloth be bought for 225*l.* and ſold again for 247*l.* 10*s.* what was the gain per cent ?

Anſw. £10.

80. Bought a puncheon of rum for 27*l.* 6*s.* how ſhould the ſame be retailed per gallon, to gain 20 per cent ?

Anſw. 7*s.* $9\frac{1}{2}\ \frac{2}{5}$*d.*

81. A draper bought 84 yards of ſuperfine broad cloth, for which he gave 63*l.* I deſire to know how he muſt ſell it per yard, to gain 10 guinea by the whole ?

Anſw. 17*s.* 6*d.*

N. B. For more examples ſee Practice.

V. EXCHANGE. See queſt. 18.

DEFINITION.

Exchange is the giving the money, weight, or meaſure of one country, for the like value in bills, money, weight or meaſure of another country.

Note. The Par, or intrinſic value of any foreign money, compared with ſterling money, is always fixed and certain, but the courſe of exchange riſes or falls almoſt every day.

I. Holland, Flanders, and Germany.

8 Pennings make 1 Groet, or penny groſs,
2 Groets —— 1 Stiver,
6 Stivers —— 1 Shilling,
20 Shillings —— 1 Pound Flemiſh,
20 Stivers —— 1 Guilder or Florin,
6 Guilders —— 1 Pound Flemiſh,
2½ Guilders —— 1 Rix-dollar.

82. What ſum muſt be paid at Amſterdam for a bill of 150*l.* ſterling, at 33*s.* 6*d.* per £. ſterling ?
Anſw. 251 : 5 pounds Flemiſh.

83. A merchant at Amſterdam remits 251 : 5 pounds Flemiſh, to be paid in London ; how much ſterling money muſt he draw for, the exchange being at 33*s.* 6*d.* Flemiſh per £. ſterling ? Anſw. £150.

84. How many guilders will pay a bill of exchange of 500*l.* ſterling, at 35*s.* 6*d.* Flemiſh per £. ſterling ?
Anſw. 5325.

II. Italy.

12 Deniers make 1 Sol,
20 Sols —— 1 Livre,
5 Livres —— 1 Piece of eight at Genoa,
6 Ditto —— 1 Ditto Leghorn.

Note. Exchange at Florence is by ducatoons, and at Venice by ducats.

6 Soldi make 1 Groſs.
24 Groſs —— 1 Ducat.

85. What is the value of a bill of 713 Leghorn dollars 2 livres and 13 ſols, at 4*s.* 11*d.* per dollar ?
Anſw. £175. 7*s.* 9*d.*

86. A factor hath ſold goods at Venice for 125 ducats at 4*s.* 6*d.* each, what will be the ſum in £. ſterling ?
Anſw. £28. 2*s.* 6*d.*

87. A gentleman travelling, would exchange 187*l.* 14*s.* —¾*d.* ſterling for Genoeſe dollars, each 51¼*d.* how many muſt he have ? Anſw. 879.

88. What is the value of a bill of 435 Genoa dollars 4 livres, 16 ſols, at 53*d.* per dollar? Anſw. £96. 5*s.* $5\frac{3}{4}$*d.*

III. Portugal.

400 Rees make 1 Cruſada,
1000 Reees —— 1 Mill Ree.

89. An agent at Oporto remits to London $435\frac{1}{2}$ mill rees at 75*d.* per mill ree, how much ſterling is the ſum? Anſw. £136. 1*s.* $10\frac{1}{2}$*d.*

90. If a bill be drawn from London of 441*l.* 2*s.* 11*d.* ſterling, how many mill rees at 77*d.* each? Anſw. 1375.

IV. France.

12 Deniers make 1 Sol,
20 Sols —— 1 Livre,
3 Livres —— 1 Crown.

91. Bourdeaux draws upon London for 193 French crowns, the exchange at 4*s.* 6*d.* per crown, what ſterling muſt be paid? Anſw. £43. 8*s.* 6*d.*

92. How many crowns muſt be paid at Paris to receive in London 37*l.* 2*s.* $8\frac{1}{2}$ $\frac{2}{5}$*d*, exchange at 4*s.* $2\frac{7}{8}$*d.* per crown? —— Anſw. 175.

V. Spain.

54 Maravadis make 1 Rial,
8 Rials —— 1 Piaſtre, or Piece of eight,
10 Rials —— 1 Dollar.

93. How many pieces of eight, at 4*s.* 8*d.* each, will anſwer a bill of 198*l.* 2*s.* ſterling? Anſw. 849.

94. Spain draws upon London for 612 piaſtres, exchange, at 4*s.* 2*d.* per piaſtre, how much ſterling will the draught amount to? Anſw. £127. 10*s.*

VI. Ireland.

95. London remits to Dublin 287*l.* 17*s.* 6*d.* ſterling, what muſt be received there, exchange being at 10*l.* per cent? —— Anſw. £. 316 : 13*s.* 3*d.*

N. B. Theſe queſtions in exchange are further illuſtrated by Practice.

VI. FELLOWSHIP. See queſt. 16, 17.

DEFINITION.

ellowſhip is when two or more join their ſtocks and trade together, ſo to determine each perſon's particular ſhare of the gain or loſs, in proportion to his principal in the ſame ſtock.

96. Two merchants, A. and B. trade together, A. puts into ſtock 40*l.* and B. 80*l.* they gain 100*l.* what are their ſhares of it?

		£.	*s.*	*d.*
Anſw.	A.	33	6	8
	B.	66	13	4

97. A. B. and C. enter into partnerſhip ; A. puts in 120*l.* B. 100*l.* and C. 80*l.* and they gained 60*l.* what is each man's ſhare in proportion to his ſtock ?

Anſw. A. £24. B. 20. C. 16

98. A ſhip worth 1800*l.* being entirely loſt, of which $\frac{1}{8}$ belonged to A. $\frac{1}{4}$ to B. and the reſt to C. what loſs will each ſuſtain, ſuppoſing 1080*l.* were inſured ?

Anſw. A. £90. B. 180. and C. 450.

99. X. and Z. join in company, X. puts in ſtock 520*l.* for 9 months, and Z. 750*l.* for 11 months, and they gained 215*l.* 10*s.* what is each man's part of the gain? Anſw. X. £78. Z. £137. 10*s.*

100. A. E. and J. have a paſture in common, for which they pay 50*l.* per annum ; A. puts in 12 oxen for 4 months, E. 10 oxen 6 months, and J. 8 oxen 10 months. What muſt each pay of the rent ?

Anſwer	A.	£12.	15*s.*	$3\frac{3}{4}$*d.*	$\frac{60}{188}$
	E.	15.	19	$1\frac{3}{4}$	$\frac{28}{188}$
	J.	21.	5	$6\frac{1}{4}$	$\frac{100}{188}$

VII. ALLIGATION. See queſt. 19.

DEFINITION.

By Alligation you find the rate of the compound, from having the rates and quantities of the ſeveral ſimples given :

given : this is called ALLIGATION MEDIAL. But when a quantity of each ſimple, whoſe rates are given, will compoſe a mixture of a given rate, it is termed ALLIGATION ALTERNATE, and is the reverſe of Alligation medial.

101. A farmer mingled 10 buſhels of wheat, at 5*s.* per buſhel, and 18 buſhels of rye at 3*s.* with 20 buſhels of barley at 2*s.* what was the worth of one buſhel of this mixture ? Anſw. 3*s.*

102. A grocer would mix tea at 16*s.* 14*s.* 9*s.* and 8*s.* per lb. I deſire to know what quantity of each ſort he muſt take to ſell the ſame at 10*s.* per lb.

Anſ.	2 lb. at	16*s.*	= 32	3lb. at	16*s.*	= 48
	1 —	14	= 14	3 —	14	= 42
	4 —	9	= 36	10 —	9	= 90
	6 —	8	= 48	10 —	8	= 80
	13	÷	130 = 10*s*	26	÷	260 = 10*s*

1 lb. a	16*s.*	= 16
2 —	14	= 28
6 —	9	= 54
4 —	8	= 32
13	÷	130 = 10*s.*

N. B. As queſtions of this nature are intended more for curioſity than real uſe, and are in themſelves very imperfect, I preſume enough has been already added on that head.

VIII. POSITION, or the Rule of FALSE.

See queſtion 20.

DEFINITION.

In Poſition any ſuppoſed numbers are taken, and by which we have the true ones required.

103. A man overtaking a driver of a flock of ſheep ſaid, Where are you going with your 66 ſheep ? Replied

the ſhepherd, You greatly miſtake the number; for if I had as many more, half as many more, and one fourth part as many, then I ſhould have but 66. The queſtion is how many ſheep there were? Anſw. 24.

104. A recruiting officer being aſked what number of men he had inliſted, anſwered, he did not readily know; yet he was certain that the $\frac{1}{2}$, $\frac{2}{3}$, $\frac{4}{5}$, and $\frac{1}{6}$ of their number added together made 384. Quere what was the number? ——— Anſw. 180.

105. What number is it whoſe $\frac{1}{6}$, $\frac{1}{7}$, and $\frac{1}{3}$ part makes 27? —— —— Anſw. 42.

106. Three perſons, A. B. and C. diſcourſing about their age, ſays B. to A. I am as old and half again as old as you; then ſays C. to B. I am twice as old as you, and now ſays A. to them both, I am ſure the ſum of all our ages is 154 years. I demand each man's age?

Anſw. A. 28. B. 42, and C. 84.

107. A banker received a certain ſum of money at the rate of 6 per cent per annum, at the end of 10 years he paid for principal and intereſt 250*l.* what was the ſum lent? —— Anſw. £156. 5*s.*

* * *

P R A C T I C E.

DEFINITION.

PRACTICE is a compendious way of the Golden Rule, and ſaves the trouble of ſtating queſtions, and the many tedious reductions by dividing by the parts contained in the whole.*

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* As to a demonſtration of Practice, it is manifeſt from the nature of Proportion, which has been already largely inſiſted on under its proper head.

TABLE I.

Even Parts of a Shilling.			Its further Uſe.		
1*d.*	is	$\frac{1}{12}$	4½*d.*	is	$\frac{3}{8}$
1½	—	$\frac{1}{8}$	7½	—	$\frac{5}{8}$
2	—	$\frac{1}{6}$	8	—	$\frac{2}{3}$
3	—	$\frac{1}{4}$	9	—	$\frac{3}{4}$
4	—	$\frac{1}{3}$	10	—	$\frac{5}{6}$
6	—	$\frac{1}{2}$	10½	—	$\frac{7}{8}$

TABLE II.

Even Parts of a £. ſterling.

s.		*d.*		
—	:	2	is	$\frac{1}{120}$
—	:	3	—	$\frac{1}{80}$
—	:	4	—	$\frac{1}{60}$
—	:	6	—	$\frac{1}{40}$
—	:	8	—	$\frac{1}{30}$
1	:	—	—	$\frac{1}{20}$
~~1~~	~~:~~	~~3~~	~~—~~	~~$\frac{1}{16}$~~
1	:	8	—	$\frac{1}{12}$
2	:	—	—	$\frac{1}{10}$
2	:	6	—	$\frac{1}{8}$
3	:	4	—	$\frac{1}{6}$
4	:	—	—	$\frac{1}{5}$
5	:	—	—	$\frac{1}{4}$
6	:	8	—	$\frac{1}{3}$
10	:	—	—	$\frac{1}{2}$

Further uſe of Table II.

s.		*d.*			*s.*		*d.*		
1	:	2	is	$\frac{7}{120}$	5	:	4	is	$\frac{8}{30}$
1	:	3	—	$\frac{5}{80}$	5	:	6	—	$\frac{11}{40}$
1	:	4	—	$\frac{4}{60}$	7	:	4	—	$\frac{11}{30}$
1	:	6	—	$\frac{3}{40}$	7	:	6	—	$\frac{3}{8}$
1	:	9	—	$\frac{7}{80}$	8	:	—	—	$\frac{2}{5}$
1	:	10	—	$\frac{11}{120}$	8	:	4	—	$\frac{5}{12}$
2	:	3	—	$\frac{9}{80}$	11	:	8	—	$\frac{7}{12}$
2	:	4	—	$\frac{7}{60}$	12	:	—	—	$\frac{3}{5}$
2	:	8	—	$\frac{8}{60}$	12	:	6	—	$\frac{5}{8}$
2	:	9	—	$\frac{11}{80}$	13	:	4	—	$\frac{2}{3}$
3	:	—	—	$\frac{3}{20}$	15	:	—	—	$\frac{3}{4}$
3	:	6	—	$\frac{7}{40}$	16	:	—	—	$\frac{4}{5}$
3	:	8	—	$\frac{11}{60}$	16	:	8	—	$\frac{5}{6}$
4	:	6	—	$\frac{9}{40}$	17	:	6	—	$\frac{7}{8}$
4	:	8	—	$\frac{7}{30}$	18	:	4	—	$\frac{11}{12}$

TABLE III.

Tenths of a £.

s.			*s.*		
2	is	$\frac{1}{10}$	12	is	$\frac{6}{10}$
4	—	$\frac{2}{10}$	14	—	$\frac{7}{10}$
6	—	$\frac{3}{10}$	16	—	$\frac{8}{10}$
8	—	$\frac{4}{10}$	18	—	$\frac{9}{10}$

I. When the price of the integer is an even part of a ſhilling, divide the given quantity by that part, and the quotient will be ſhillings; which reduce to pounds, as has been already directed in the application of multiplication and diviſion.*

1. 214 yards of tape, at $1\frac{1}{2}d.$ per yard.

214

$1\frac{1}{2}d.$ — $\frac{1}{8}$ | 2,6 : 9

£1. 6*s*. 9*d*.

N. B. The diviſor 20 is omitted, as being far neater and more commodious.

2. 217 Oranges at 2*d*. each.

217

2*d*. — $\frac{1}{6}$ | 3,6 : 2

£1. 16*s*. 2*d*.

3. 312 Lemons at 3*d*. each.

312

3*d*. — $\frac{1}{4}$ | 7,8

£3. 18*s*.

4. 321 yards of ribbon, at 4*d*. per yard.

321

4*d*. — $\frac{1}{3}$ | 10,7

£5. 7*s*.

---

* The proof of the truth of the above and following operations, is by the Rule of Three, or by working the ſame example different ways, as may be ſeen in the proceſs, which will be copiouſly handled in all its varieties.

5. 217lb. of ſtarch, at 6*d*. per lb.

217
6*d*. — ½ | 10,8 : 6
£5. 8*s*. 6*d*.

6. 214 bottles of cyder, at 10*d*. per bottle.

214
5
6)1070
17,8 : 4
£8. 18*s*. 4*d*.

		£.	*s*.	*d*.
7.	2637 yards, at 1*d*. per yard. Anſw.	10	19	9
8.	175 ells, at 1½ per ell. ——	1	1	10½
9.	472 oz. at 2*d*. per oz. ——	3	18	8
10.	721lb. at 3*d*. per lb. ——	9	—	3
11.	514 quarts of beer, at 4*d*. per quart.	8	11	4
12.	711 yds. of ribbon at 6*d*. per yd.	17	15	6
13.	What coſt 214 pints of rum at 7½*d*. per pint? ——	6	13	9
14	If 1 quire of paper coſt 9*d*. what coſt 349 quires? ——	13	1	9
15.	What coſt 2625 yds. of cloth, at 10½*d*. per yard? ——	114	16	10½

II. When the price of the integer is the aliquot part of a £. ſterling, you have only to divide the given quantity by that part, and the quotient will be pounds.

16. 413 dozen of buttons, at 1*s.* 2*d.* per dozen.

413
7

12,0)289,1

£24. 1*s.* 10*a.*

or thus :

413 : — } add
2*d.* — $\frac{1}{6}$ | 68 : 10 }

48,1 : 10

£24. 1*s.* 10*d.*

or thus : 413
d.
8 — $\frac{1}{30}$ | 13 : 15 : 4
6 — $\frac{1}{40}$ | 10 : 6 : 6

1,2 £24 : 1 : 10

17. 421 pair of ſtockings, at 1*s.* 4*d.* per pair.

421
4

6,0)168,4

£28. 1*s.* 4*d.*

18. 327 pair of children's ſhoes, at 1*s.* 8*d.* per pair.

1*s.* 8*d.* — $\frac{1}{12}$ | 327

£27. 5*s.*

19. 519 gallons, at 1*s.* 10*d.* per gallon.

519
11

12,0)570,9

£47. 11*s.* 6*d.*

20. 253 buſhels of oats, at 2*s.* 3*d.* per buſhel.

253
9

8,0)227,7

£28. 9*s.* 3*d.*

or

2*s.* —*d.* — $\frac{1}{10}$
— 3 — $\frac{1}{8}$

2 : 3

253

25 : 6 : —
3 : 3 : 3 } add

£28 : 9 : 3

or 253
2

506 : —
3*d.* — $\frac{1}{4}$ 63 : 3 } add

56,9 : 3

£28 : 9 : 3

N. B. All the preceeding examples are ſubject to the ſame varieties, and almoſt all the following.

21. 634 buſhels of malt, at 3*s.* 8*d.* per buſhel.

634
11

6,0)697,4

£116. 4*s.* 8*d.*

22. 721 ounces of plate, at 7*s.* 4*d.* per oz.

721
11

3,0)793,1

£264. 7*s.* 4*d.*

23. 314 yards of ſattin, at 18*s.* 4*d.* per yard.

314	or		314	
11				
	6*s.* 8*d.* —	$\frac{1}{3}$	104 : 13 : 4	
12)3454	6 : 8 —	$\frac{1}{3}$	104 : 13 : 4	add
	5 : – —	$\frac{1}{4}$	78 : 10 : —	
£287. 16*s.* 8*d.*				
	18 : 4		£287 : 16 : 8	

	£.	*s.*	*d.*
24. 826lb. at 1*s.* 2*d.* per lb. Anſw.	48	3	8
25. If a quart of wine coſt 1*s.* 3*d.* what muſt be given for 651 quarts ?	40	13	9
26. At 1*s.* 4*d.* per oz. what coſt 842 oz ?	56	2	8
27. If I gave for 1 yard of ſtuff 18*d.* what will 360 yds. ſtand me in ?	27	—	—
28. What coſt 654 gallons at 20*d.* per gallon ?	54	10	—
29. What coſt 1509 buſhels of oats at 21*d.* per buſhel ?	132	—	9
30. At 22*d.* per ell what coſt 2076 ells ?	190	6	—
31. If 1 dozen of buttons coſt 2*s.* 3*d.* what coſt 506 doz. at the ſame rate ?	56	18	6
32. At 2*s.* 4*d.* per pair what coſt 422 pair ?	49	4	8
33. At 2*s.* 8*d.* per buſhel what coſt 1038 buſhels ?	138	8	—
34. Sold 1779 yds. of dowlas at 2*s.* 9*d.* per yd. what did the whole amount to ?	244	12	3
35. Bought 982 pair of ſtockings at 3*s.* per pair, what did the whole coſt ?	147	6	—
36. What muſt I give for 597 yds. of Iriſh when it is ſold at 3*s.* 6*d.* per yard ?	104	9	6
37. At 3*s.* 8*d.* per ell what coſt 317 ells ?	58	2	4
38. At 4*s.* 6*d* per lb. what coſt 143 lbs.	32	3	6
39. At 4*s.* 8*d.* per pair what coſt 902 pair ?	210	9	4
40. What coſt 106 pair of ſtockings at 5*s.* 4*d.* per pair ?	28	5	4

41. What

	£.	*s.*	*d.*
41. What coſt 103 oz. of plate, at 5*s.* 6*d.* per oz?	28	6	6
42. What coſt 1442 buſhels of wheat at 7*s.* 4*d.* per buſhel?	528	14	8
43. If one yard of lawn coſt 8*s.* what coſt 175 yards?	70	—	—
44. If 1 pair of ſhoes coſt 8*s.* 4*d.* what coſt 102 pair?	42	10	—
45. Bought 304 yards of cambric at 11*s.* 8*d.* per yd. what did the whole coſt?	177	6	8
46. Sold 185 dozen of raiſin wine at 12*s.* per doz. what was the amount?	111	—	—
47. At 12*s.* 6*d.* per yard, what coſt 67 yards?	41	17	6
48. At 13*s.* 4*d.* per oz. what coſt 854 oz?	569	6	8
49. At 15*s.* per dozen, what coſt 496 dozen?	372	—	—
50. What coſt 170 yds. of ſuperfine cloth at 16*s.* per yard?	136	—	—
51. What coſt 200 yards of ſattin at 16*s.* 8*d.* per yard?	166	13	4
52. At 17*s.* 6*d.* per doz. what coſt 834 doz?	729	15	—
53. What coſt 157 yds. of rich ſilk at 18*s.* 4*d.* per yard?	143	18	4

CONTRACTIONS to ſeveral of the foregoing EXAMPLES.

421 pair, at 1*s.* 4*d.*

		421
s. *a.*		
6 : 8	— $\frac{1}{3}$	140 : 6 : 8
1 : 4	— $\frac{1}{5}$	£. 28 : 1 : 4

See example 17.

519 Gallons at 22*d.*

s. *d.*	519
7 : 4 — $\frac{11}{30}$	190 : 6 : —
1 : 10 — $\frac{1}{4}$	£. 47 : 11 : 6

See example 19.

253 Buſhels at 2*s.* 3*d.*

s. *d.*	253
4 : 6 — $\frac{9}{40}$	56 : 18 : 6
2 : 3 — $\frac{1}{2}$	£. 28 : 9 : 3

See example 20.

634 Buſhels at 3*s.* 8*d.*

s. *d.*	634
18 : 4 — $\frac{11}{12}$	581 : 3 : 4
3 : 8 — $\frac{1}{5}$	£. 116 : 4 : 8

See example 21.

314 yards at 18*s.* 4*d.*

s. *d.*	314	} ſub.
1 : 8 — $\frac{1}{12}$	26 : 3 : 4	
	£. 287 : 16 : 8	

See example 23.

N B. Here once more I remind the learner that ſuch queſtions as are omitted are, nevertheleſs, ſubject to the like varieties, and that the ſame be filled up by him.

III. When the price of the integer be 10ths of a £. ſterling, multiply the given quantity by the numerator, and double the figure in units place of the product, for ſhillings; the figures to the left will be pounds.

The reaſon for this proceſs is obvious, as the remainder, after dividing by 10, will be ſo many tenths of a pound as there are units in the remainder.

54. 215 pair of gloves at 2*s.* per pair.

21,5

s.

2 — $\frac{1}{10}$ £. 21 : 10

55. 319 dozen of buttons at 4*s.* per doz.

319

2

s.

4 — $\frac{2}{10}$ £. 63 : 16

56. 527 groſs at 14*s.* per groſs

527

7

s.

14 — $\frac{7}{10}$ £. 368 : 18

£. *s.* *d.*

57. What coſt 645lb. at 2*s.* per lb? Anſw. 64 : 10 : —

58. What coſt 638 yards at 4*s.* per yd? 127 : 12 : —

	£.	s.	d.
59. At 6*s*. per buſhel, what coſt 2044 buſhels? — Anſw.	613	4	—
60. At 8*s*. per thouſand, what coſt 143 thouſand? ——	57	4	—
61. What coſt 668 groſs at 12*s*. per groſs? —— ——	400	16	—
62. At 14*s*. per pair, what coſt 1054 pair? —— ——	737	16	—
63. If 1 lb of tea coſt 16*s*. what coſt 207 lb. —— ——	165	12	—
64. If 1 yd. of broad cloth coſt 18*s*. what coſt 243 yds. ——	218	14	—

VI. When the given price be no aliquot or even part of a penny, ſhilling, or pound; divide it into ſeveral aliquot or even parts and work for each as have been already directed: Add the quotients together, the ſum will be the anſwer.

Note, where convenient, I would prefer the taking Parts of parts, rather than parts of the whole.

65. 532 loaves at $3\frac{3}{4}$*d*.

d.		532			
3	— $\frac{1}{80}$	6	13	—	add
$\frac{3}{4}$	— $\frac{1}{4}$	1	13	3	
$3\frac{3}{4}$		£. 8	6	3	

66. $523\frac{1}{2}$ yds. at $17\frac{1}{2}$ per yd.

s.		523		
1 : — : —	$\frac{1}{20}$	26	3	
4 : —	$\frac{1}{3}$	8	14	4
$1\frac{1}{2}$: —	$\frac{1}{8}$	3	5	$4\frac{1}{2}$
				* $8\frac{3}{4}$ $\frac{1}{2}$ yd.
		£. 38	3	$5\frac{1}{4}$

* When there is a fraction annexed to the given quantity take ſuch parts out of the given price and place the ſum under the reſt,

and add all together: or multiply the price by the numerator (or top figure) of the fraction, and divide the product by the denominator (or lower figure) and you will have the fractional value at once.

67. $416\frac{5}{8}$ yds. at 2*s.* 11*d.* per yd.

5
8 | 14 : 7
1 : $9\frac{3}{4}$ $\frac{4}{8}$ *

416
s. *d.*
2 : 6 — $\frac{1}{8}$ | 52 : —
5 — $\frac{1}{6}$ | 8 : 13 : 4
| 1 : $9\frac{3}{4}$
2 : 11
£. 60 : 15 : $1\frac{3}{4}$

* If there be any remainders after the farthings, as in the above example, they will be omitted as being of no ſervice in common buſineſs.

68. 224 doz. at 6*s.* 5*d.* per doz.

224
s.
5 : — $\frac{1}{4}$ | 56 : —
1 : — $\frac{1}{20}$ | 11 : 4
— : 5 — $\frac{1}{12}$ | 4 : 13 : 4
£. 71 : 17 : 4

69. 807 doz. at 13*s.* 6*d.* per doz.

807
s. *d.*
11 : 8 — $\frac{7}{12}$ | 470 : 15
1 : 10 — $\frac{11}{120}$ | 73 : 19 : 6
13 : 6
£. 544 : 14 : 6

70. 214 cwt. at 3*l.* 1*s.* 8*d.* per cwt.

214
3

s. d.
1 : 8 — $\frac{1}{12}$ | 642 :
| 17 : 16 : 8

£.659 : 16 : 8

CONTRACTIONS.

71. 235 oranges at $\frac{3}{4}$ each.

235

d.
3 — $\frac{1}{80}$ | 2 : 18 : 9

$\frac{3}{4}$ — $\frac{1}{4}$ | £.— : 14 : 8$\frac{1}{4}$

72. 532 loaves at 3$\frac{3}{4}$*d.* each.

532

s. d.
2 : 6 — $\frac{1}{8}$ | 66 : 10

3$\frac{3}{4}$ — $\frac{1}{8}$ | £.8 : 6 : 3

73. 523$\frac{1}{2}$ yards at 17$\frac{1}{2}$*d.* per yd.

523

s. d.
1 : 3 — $\frac{5}{80}$ | 32 : 13 : 9
2$\frac{1}{2}$ — $\frac{1}{6}$ | 5 : 8 : 11$\frac{1}{2}$
| 8$\frac{3}{4}$

£.38 : 3 : 5$\frac{1}{4}$

See example 66.

74. 224

74. 224 dozen at 6*s.* 5*d.* per doz.

		224		
s.	d.			
4 : 8	— $\frac{7}{30}$	52 :	5 :	4
1 : 9	— $\frac{7}{80}$	19 :	12 :	—
6 : 5		£. 71 :	17 :	4

See example 68.

		£.	s.	d.
✓ 75. What coſt 34742 apples at ¼*d.* each?	Anſw.	36 :	3 :	9½
76. What coſt 2905 cakes at ½*d.* each?		6 :	1 :	—½
77. What coſt 470 oranges at ¾*d.* each?		1 :	9 :	4½
78. 26193 yds. of tape at 1¼*d.* per yd.		136 :	8 :	5¼
✓ 79. At 1¾*d.* each, what coſt 942?		6 :	17 :	4½
✓ 80. If 1lb. coſt 2¼*d.* what coſt 5226lbs?		48 :	19 :	10½
81. What coſt 2613 pints at 2¾*d.* per pint?		29 :	18 :	9¾
82. At 3½*d.* per quart, what coſt 1265⅔ quarts?		18 :	9 :	1⅚
83. At 5¾*d.* per lb. what coſt 323⅔lb?		7 :	15 :	1
84. If 1 oz. coſt 6¾*d.* what coſt 935 oz?		26 :	5 :	11¼
85. At 9¼*d.* per quire, what coſt 365 quires?		14 :	1 :	4¼
✓ 86. At 11¾*d.* per buſhel, what coſt 346 buſhels?		16 :	18 :	9½
✓ 87. What coſt 822 feet at 14¼*d.* per foot?		48 :	16 :	1½
✓ 88. What coſt 716 ſtone of beef at 19½ per ſtone?		58 :	3 :	6
89. At 21*d.* per yd. what coſt 279 yds?		24 :	8 :	3
90. At 23½*d.* per gallon, what coſt 147⅖ gallons?		14 :	8 :	7¾
91. If a barrel of oyſters coſt 3*s.* 9*d.* what coſt 277 barrels?		51 :	18 :	9
92. Bought 100$\frac{7}{9}$ yards at 5*s.* 7*d.* per yd. what did the whole ſtand me in?		28 :	2 :	8

	£.	*s.*	*d.*
93. What coſt 351 gallons at 7*s.* 7*d.* per gallon? Anſw.	133	1	9
94. At 9*s.* 3*d.* per dozen, what coſt 351 doz?	162	6	9
95. What coſt 214 yds. of cambric at 11*s.* 9*d.* per yd?	125	14	6
96. What coſt 183⅖ ells at 13*s.* 11*d.* per ell?	127	12	3¾
97. What coſt 185½ lbs. at 15*s.* 3*d.* per lb?	141	8	10½
98. At 17*s.* 2*d.* per yd. what coſt 117⅚ yds?	101	2	9½
99. At 19*s.* 7*d.* per gallon, what coſt 199 gall?	194	17	1
100. If 1 cwt. coſt 2*l.* 2*s.* 6*d.* what coſt 907 cwt?	1927	7	6
101. If an anchor of brandy coſt 4*l.* 7*s.* 6*d.* what coſt 100 anchors?	437	10	—

V. TARE and TRETT.

Even parts of a ton.

C.	q.	lb.		
1	—	—	is	1/20
2	—	—	—	1/10
2	2	—	—	1/8
2	3	12	—	1/7
4	—	—	—	1/5
5	—	—	—	1/4
10	—	—	—	1/2

Even parts of an cwt.

lb.		
14	is	1/8
16	—	1/7
28	—	1/4
56	—	1/2

Even parts of a ¼ cwt.

lb.		
3½	is	1/8
4	—	1/7
7	—	1/4
14	—	1/2

The allowances uſually made in weight are Tare, Trett, Suttle, Cloff, and Neat.

Note. Tare is the allowance at ſo much per box, bag, &c. at ſo much per cwt. or at ſo much in the groſs weight. Trett is 4lbs. in every 104lbs. allowed for waſte, &c. Cloff is 2lb. on every 3 cwt on ſome ſorts of goods; Suttle is when part of the allowance is deducted from the groſs; and Neat is the pure weight when the ſeveral allowances are deducted.

102. What is the neat weight and value of 24 hhds. of ſugar each 7 cwt. 2 qrs. 14 lb. Tare at 14lb. per cwt. and at £ 1. 17*s.* 6*d.* per cwt.

Cwts. qrs. lbs.
7 : 2 : 14
6
45 : 3 : — wt. 6 hhds.
4
lb. 183 : — : — do. 24. } ſub.
14 — $\frac{1}{8}$ | 22 : 3 : 14 tare. }
160 : — : 14 neat }
17*s.* 6*d.* — $\frac{7}{8}$ | 140 : — : — } add
14lb. — $\frac{1}{8}$ | — : 4 : 8$\frac{1}{4}$ }
£. 300 : 4 : 8$\frac{1}{4}$ value

103. What is the value and neat weight of 10 hhds. of tobacco weighing 94 cwt. 2 qrs. 7 lb. Groſs. Tare 10 cwt. 2 qrs. 7 lbs. Trett 4 lbs. in every 104 lbs. Cloff 2 lbs. per cwt. at £2. 12*s.* 6*d.* per cwt?

		cwts.	qrs.	lbs.		
		94	2	7	groſs	
		10	2	7	tare	
		84	—	—	ſuttle	ſub.
4lb. —	$\frac{1}{26}$	3	—	25	trett	
		80	3	3	ſuttle	ſub.
2lb. —	$\frac{1}{56}$	1	1	21	cloff	
		79	1	10	neat	
		2				
		158				
12*s.* 6*d.* —	$\frac{5}{8}$	49	7	6		
$\frac{1}{4}$ —	$\frac{1}{4}$	—	13	1½		
8lb. —	$\frac{1}{14}$	—	3	9		
2 —	$\frac{1}{4}$	—	—	11¼		
	£.	208	5	3¾		

104. What is the value and neat weight of 12 hhds. weighing 91 cwt. 2 qrs. groſs, tare 14 lb. per cwt. and at 1*l.* 17*s.* 6*d.* per cwt?

Anſw. 80 cwt. — q. 7 lb. neat £150. 2*s.* 4*d.* value.

105. What is the value and neat weight of 5 hhds. of ſugar weighing 44 cwt. 3 q. 14 lb. groſs, tare in all 142 lb. trett 4 lb. in every 104 lb. at 2*l.* 16*s.* per cwt?

Anſw. { 41 cwt. 3 q. 21 lb. neat.
£117. 8*s.* 6*d.* value.

106. What is the value of 21 cwt. 2 q. groſs, tare 104 lbs. at 1*l.* 10*s.* per cwt?

Anſw. £30. 17*s.* 1½*d.*

107 Bought a quantity of tea weighing groſs 5 cwt. 2 q. 8 lbs. tare 3 q. 15 lb. at 26*l.* 12*s.* per cwt. what does it come to?

Anſw. £124. 13*s.* 9*d.*

VI. Com-

VI. COMMISSION, BROKAGE, purchaſing of STOCKS, INSURANCE, LOSS and GAIN, and EXCHANGE.

108. What is the commiſſion of a broker for ſelling 750*l.* ſtock at 2*s.* 6*d.* per cent?

7,50*l.*
20

s. 10,00

7*l.* 10*s.*

2*s.* 6*d.* — $\frac{1}{8}$ — : 18 : 9 Anſw.

See example 55. Proportion.

109. Find the commiſſion of an agent for buying goods to the amount of 570*l.* 10*s.* at 3½ per cent?

570*l.* 10*s.*

10*l.* — $\frac{1}{10}$ | 57 : 1

3½ — $\frac{7}{20}$ | £. 19 : 19 : 4

Or,

570*l.* 10*s.*

3½ — $\frac{7}{200}$ | 19 : 19 : 4

See example 56. Proportion.

110. Shipped for Leghorn goods to the value of 1500*l.* 10*s.* 4½*d.* upon which an inſurance is made at 10½ per cent. I demand what it comes to?

$$\begin{array}{lll|rrrl}
 & & & 1500l. & 10s. & 4\frac{1}{2}d. & \\
\hline
10l. & — & \frac{1}{10} & 150 : & 1 : & —\frac{1}{4} & \rbrace\ \text{add} \\
\frac{1}{2} & — & \frac{1}{20} & 7 : & 10 : & —\frac{1}{2} & \\
\hline
 & & & £.\ 157 : & 11 : & —\frac{3}{4} & \\
\end{array}$$

See example 58. Proportion.

111. What is the purchaſe of 870*l.* bank ſtock at 132 per cent?

$$\begin{array}{lll|l}
 & & & 870 \\
20l. & — & \frac{1}{5} & 174 \\
10 & — & \frac{1}{2} & 87 \\
2 & — & \frac{1}{5} & 17 : 8 \\
\hline
 & & & 1148 : 8 \\
\end{array}$$

See example 59. Proportion.

112. At 2½ per cent. per annum, what is the intereſt of 420*l.* 10*s.* 6*d.* for 5 years?

$$\begin{array}{lll|rrrl}
 & & & 420l. & 10s. & 6d. & \\
\hline
10l. & & \frac{1}{10} & 42 : & 1 : & —\frac{1}{2} & \\
\hline
2\frac{1}{2} & — & \frac{1}{4} & 10 : & 10 : & 3 = & 1\ \text{year} \\
 & & & & & 5 & \\
\hline
 & & & £.\ 52 : & 11 : & 3 = & 5\ \text{years} \\
\end{array}$$

See example 62. Proportion.

113. What is the amount of 312*l.* 10*s.* at 4 per cent per annum, for 6 years?

312*l.* 10*s.*

20*l.* $\frac{1}{5}$ | 62 : 10

4 — $\frac{1}{5}$ | 12 : 10 = 1 year

6

75 : — 6 years int. } add

312 : 10 principal

£. 387 : 10 Anſw.

See example 63. Proportion.

114. At what price muſt I ſell a parcel of cloth which coſt me 225*l.* to gain 10 per cent?

£.10 — $\frac{1}{10}$ | 225 prime coſt } add

22 : 10 gain

£247 : 10 Anſw.

115. A factor hath ſold goods at Venice for 125 ducats, at 4*s.* 6*d.* what is the value in pounds ſterling?

125

4*s.* 6*d.* — $\frac{9}{40}$ £28 : 2 : 6

See example 86.

116. Spain draws upon London for 849 pieces of eight at 4*s.* 8*d.* each; how much ſterling will the draught amount to?

849

849.

4*s*. 8*d*. — $\frac{7}{30}$ £198 : 2 Anſwer.

	£.	*s*.	*d*.
117. What is the commiſſion of 189*l*. 17*s*. 3½*d*. at 1½ per cent?	Anſw. 2	16	11¼
118. What is the commiſſion of 475*l*. at 3⅞ per cent?	18	8	1½
119. At 2½ per cent what is the commiſſion of 241*l*. 13*s*. 4*d*?	6	—	10
120. Find the aſſurance of 175*l*. 7*s*. 2*d*. at 5¼ per cent?	9	4	1¼
121. At 5¾ per cent what is the aſſurance of 4359*l*. 8*s*. 4*d*?	250	13	3¾
122. What is the purchaſe of 1548*l*. bank ſtock at 127⅞ per cent?	1979	10	1
123. At 96 per cent what is the purchaſe of 3737*l*. 10*s*. bank annuities?	3588	—	—
124. Shipped for Gibraltar, goods the value of 1500*l*. upon which I made an inſurance at 8⅞ per cent, what does it come to?	133	2	6
125. At what price muſt I ſell a quantity of tea which coſt 19*l*. 6*s*. 2*d*. to gain 24$\frac{3}{10}$ per cent?	23	19	11¾
126. If a lb. of tea coſt 10*s*. 6*d*. at what price muſt I ſell the ſame to loſe 15*l*. per cent?	—	8	11¼
127. If a pipe of wine coſt 72*l*. 10*s*. 6*d*. at what price muſt I ſell the ſame to gain 10 per cent?	65	5	5½

128. What ſum muſt be paid at Amſterdam for a bill of 580*l*. ſterling at 33 : 4 Flemiſh per £. ſterling?
Anſw. 966⅔

129. Drawn 625*l*. ſterling upon Rotterdam, at 35 : 6 Flemiſh per £. ſterling, what ſum of money muſt be paid at Rotterdam? Anſw. 6656 guilders 5ſt.

130. What is the value of 250 ducats, each 4*s.* 6*d* ?
Anſw. £56. 5*s.*

131. Change 220*l.* 11*s.* 5½*d.* ſterling into mill rees, each 6*s.* 5*d.* ſterling. Anſw. 687½

132. Change 306 piaſtres, each 4*s.* 2*d.* into ſterling money. Anſw. £63. 15*s.*

133. London remits to Dublin 575*l.* 15*s.* ſterling, what muſt be received there, exchange at 10 per cent ?
Anſw. £633. 6*s.* 6*d.*

The RULE of FIVE.

DEFINITION.

THis rule is ſo called becauſe that in it are five numbers, or terms, given to find a ſixth.

RULE.

Let your firſt and fourth be of one name, and ſo likewiſe your ſecond and fifth ; then agreeable to the rule delivered in the Rule of Three, *i. e.* When more requires more or leſs requires leſs, multiply your firſt and ſecond for a diviſor and your third, fourth, and fifth together for your dividend, and the quotient will be the anſwer. But if more requires leſs, or leſs requires more, multiply your ſecond, third, and fourth together for a dividend, and your firſt and fifth for a diviſor, and the quotient will give the required anſwer.

1. If 10 horſes eat 45 buſhels of oats in 12 days, how many buſhels will be ſufficient for 15 horſes 20 days?

h. : d. : b. :: d. : h.
10 : 12 : 45 :: 15 : 20
12 45
120 675
20
12,0)1350,0
Anſw. $112\frac{1}{2}$

2. If 100*l.* in one year gain 5 per cent intereſt, what will be the intereſt of 555*l.* in 5 years?

£. : y. : £. :: £. : y.
100 : 1 : 5 :: 555 : 5
5
2775
5
138,75
20
15,00

Anſw. £138. 15*s.*

3. What principal will gain 138*l.* 15*s.* in 5 years at 5 per cent per annum?

```
£.      y.      £.        £.    s.     y.
 5  :   1   :  100  ::  138 ,, 15  :   5
 5                          100
---                      -------
35                        13800
          10s. — ½    |       50
           5   — ½    |       25
                         -------
                        5)13875
                         -------
                         5)2775
                           ----
                            555   Anſwer.
                           ----
```

4. A wall was to be built to the height of 36 feet, was raiſed to the height of 12 feet by 10 men in 20 days; how many men muſt be employed to finiſh the wall in 5 days? —— —— Anſw. 80 men.

5. If 100*l.* in 12 months gain 5 per cent intereſt, what will 250*l.* gain in 9 months? Anſw. £9. 7*s.* 6*d.*

6. If 250*l.* is lent out at intereſt, and in 9 months the principal and intereſt amounted together to the ſum of 259*l.* 7*s.* 6*d.* I demand what was the rate per cent per annum? —— —— Anſw. £5.

7. If 100*l.* in 12 months gain 5 per cent intereſt, what principal will gain 9*l.* 7*s.* 6*d.* in 9 months?

Anſw. £250.

8. If a family of 12 perſons drank 120 gallons of wine in 20 days, how many gallons will ſuffice another company of 15 perſons 10 days? Anſw. 75 gallons.

PRO-

PROGRESSION

ARITHMETICAL OR GEOMETRICAL.

DEFINITION.

ARITHMETICAL PROGRESSION is a ſeries of numbers or quantities increaſing or decreaſing by an equal interval, or common difference.

To Arithmetical Progreſſion belong the five following articles, viz.

1. The firſt term.
2. The laſt term.
3. The number of terms.
4. The ratio or equal difference.
5. The ſum of all the terms.

Any three of which being given, the other two may be eaſily found.

I. The 2d, 3d, and 4th terms being given to find the firſt.

Multiply the 4th by the 3d, make leſs one; the product ſubtracted from the 2d gives the 1ſt.

EXAMPLE.

1. A man in 73 days performed a journey, every day encreaſing the former by 2 miles, and the laſt day he went 147 miles; what was the firſt day's journey?

$2 \times 72 = 144 - 147 = 3$ the firſt day's journey.

II. The 1ſt, 3d, and 4th terms being given to find the 2d.

Subtract the fourth from the product of the third multiplied by the fourth, that remainder added to the firſt gives the ſecond.

EXAMPLE.

2. A traveller ſet out, and the firſt day went 3 miles, the ſecond day 5, increaſing every day 2 miles, and travelled 73 days; how many miles did he go the laſt day? Anſw. 147.

III. The 1ſt, 2d, and 4th terms being given to find the 3d.

From the 2d ſubtract the 1ſt, the remainder divide by the 4th, and the quotient, add 1, gives the 3d.

EXAMPLE.

3. A perſon travelling went 3 miles the firſt day, and increaſed every day 2 miles, till at laſt he went 147 miles in 1 day; how many days did he travel? Anſw. 73.

IV. The 1ſt, 2d, and 3d terms being given, to find the 4th.

From the 2d ſubtract the 1ſt, the remainder divided by the 3d, leſs 1, gives the 4th.

EXAMPLE.

4. A man travelled 73 days, the 1ſt day he travelled 3 miles. and the laſt day 147 miles; what was the common difference of his travelling? —— Anſw. 2.

V. The 1ſt, 2d, and 3d terms being given, to find the 5th.

Add the 1ſt and laſt number together, leſs one, and multiply that ſum by half the number of places, and the product is the ſum of all the ſeries. Or in caſe the number of terms be odd, then add the 1ſt and laſt numbers together, and multiply that ſum by the number of terms, leſs one, and divide that product by 2 and you have the ſum of all the places.

EXAMPLE.

5. A man is to go from London to a certain place in 73 days, and to go but 3 miles the 1ſt day, increaſing every day 2 miles, ſo that his laſt day's journey is to be 147 miles; what number of miles diſtant is that place from London? —— —— Anſw. 5475.

The following queſtion is left for the ſcholar to diverſify as above.

6. A debt is to be paid in the following manner, viz. the 1ſt week 3*s.* increaſing 2*s.* every week for 1 year; I demand the ſum of the laſt payment? Anſw. £5. 5*s.*

7.	Anſwers.	2.	140 : 8
8.		3.	— : 3
9.		4.	— : 2
10.		5.	52 weeks or 1 year.

GEOMETRICAL PROGRESSION.

DEFINITION.

GEOMETRICAL PROGRESSION is a ſeries of numbers, or quantities, increaſing by one common multiplicator, or decreaſing by one common diviſor.

I. The ratio and firſt number being given, to find the laſt number in any ſeries in ∺ (Geometrical Progreſſion) multiply your 1ſt number by the ratio, and that product again by the ratio for ſeveral terms at pleaſure; then multiply any of thoſe places by itſelf and divide the product thereof by the 1ſt number, and it will be the double of that number, wanting one place.

EXAMPLE.

1. A gentleman bought a horſe having in his ſhoes 28 nails, at the price of the laſt nail, valuing the firſt at a farthing, and to double the price every nail; the queſtion is what was he to give for the horſe?

7th Place. 13th.
1, 2, 4, 8, 16, 32, 64, × 64 = 4096 + 4096 =
14th. 27th. 28th.
8192 × 8192 = 67108864 + 67108864 = 134217728
farthings = £139810. 2*s.* 8*d.* Anſw.

II. To find the total value of all the ſeries, the ratio and laſt number being given. Multiply the laſt term or number, by the ratio, and from that product take the 1ſt number; then divide the remainder by the ratio, leſs 1, and the quotient will be the ſum of all the ſeries.

2. If a horſe was to be ſold according to the number of nails he had in his ſhoes, which were 28 in all, at the rate of 1 farthing for the 1ſt nail, and to double the price every nail; what would he ſtand the purchaſer in at that rate?

By the foregoing operation the laſt number is farthings.

Farthings.
134217728 × 2 = 268435455 = £279620. 5*s.* 3¾*d.*

Note. As the firſt term is unity, or 1, the diviſion is ſaved.

3. What debt will be diſcharged in a year, or twelve months, by paying £2. the 1ſt month, and each ſucceeding payment being double the laſt? Anſw. 8192.

4. A gentleman gave his daughter towards her portion 1 ſhilling, promiſing to treble it every month for 1 year to come; I demand her portion?

Anſw. £13286.

PERMUTATION.

DEFINITION.

Permutation is the changing or varying the order of things.

RULE.

Multiply every number together, i. e. the 1ſt by the 2d and that product by the 3d figure, and ſo on till you have gone through all the given numbers; ſo is the laſt product the variety of changes.

EXAMPLE.

1. How many changes may be rung on 12 bells, or in how many different poſitions may 12 perſons ſit at table?

$1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8 \times 9 \times 10 \times 11 \times 12 = 479001600$

2. How many changes can be made by 7 perſons at table? ——— —— Anſw. 5040

3. How many changes can be made by 15 letters of the alphabet? ——— Anſw. 1307674368000

THE

Accountant's Companion;

OR,

Schoolmaſter's New Aſſiſtant.

PART II.

VULGAR FRACTIONS.

DEFINITIONS.

I. A FRACTION is a broken number, a part, or diviſion of an unit, or integer: A VULGAR FRACTION is expreſſed by two numbers placed one above the other having a line drawn between them.

Thus, $\frac{1}{2}$, $\frac{3}{4}$, $\frac{7}{8}$ called $\left\{\begin{array}{l}\text{Numerator.}\\ \text{Denominator.}\end{array}\right.$

Fractions admit of three diſtinctions, viz. Simple or Proper, Improper, and Compound Fractions.

II. 1ſt. A Simple, Proper, or Pure Fraction, is that which is leſs than an unit.

III. 2d. An Improper Fraction, is that which is greater than an unit.

IV. 3d. A Compound Fraction, is the Fraction of a Fraction, and known by the word OF, as $\frac{2}{3}$ of $\frac{3}{4}$, &c.

REDUCTION of VULGAR FRACTIONS.

PROPOSITION. I.

TO reduce a Compound Fraction to a Simple one of the ſame value.

RULE.

Multiply all the numerators into one another for a new numerator, and all the denominators into one another for the denominator.

EXAMPLES.

1. Reduce $\frac{2}{3}$ of $\frac{3}{4}$ of $\frac{2}{5}$ to a ſimple fraction.

$$\text{For}\left\{\begin{array}{c}2 \times 3 \times 2 = \\ 3 \times 4 \times 5 = \end{array}\right. \frac{12}{60} = \left.\right\} \frac{1}{5} \text{ Anſw.}$$

2. Reduce $\frac{3}{5}$ of $\frac{7}{8}$ to a ſimple fraction. Anſw. $\frac{21}{40}$
3. Reduce $\frac{4}{6}$ of $\frac{3}{4}$ of $\frac{2}{5}$ to a ſingle fraction. Anſw. $\frac{24}{120}$
4. Reduce $\frac{10}{15}$ of $\frac{4}{7}$ of $\frac{1}{2}$ to a proper fraction. Anſw. $\frac{40}{210}$
5. Reduce $\frac{2}{3}$ of $\frac{3}{11}$ of $\frac{4}{5}$ to a pure fraction. Anſw. $\frac{24}{165}$

The Reaſon of this Rule.

By the definition of a Compound Fraction it is ſhewed that ſuch a Fraction is only the ſubdiviſion of the parts of an unit; the reaſon whereof is therefore ſelf-evident why the denominators are multiplied together for that of a Single Fraction, as likewiſe the numerators multiplied together for the new numerators of the ſame Fraction.

PRO-

PROPOSITION. II.

To reduce a Whole or Mixt Number to an Improper Fraction, or an Improper Fraction to a Whole or Mixt Number.

RULE.

I. Multiply the integers, or whole numbers, with the denominator of the given Fraction and to their product ſubſcribe the numerator of the Fraction required.

II. Divide the numerator by the denominator, and if any thing remains place it for a new numerator over the denominator.

EXAMPLES.

1. Reduce $7\frac{3}{5}$ to an improper fraction.

$$\begin{array}{l} 5 \\ \hline 38 \\ \hline 5 \end{array}$$

Anſw. $\frac{38}{5}$

2. Reduce $\frac{38}{5}$ to a mixt number.

$$\begin{array}{l} 5)38 \\ \hline 7\frac{3}{5} \end{array}$$

Anſwer.

3. Reduce 21 to an improper fraction whoſe denominator is 7.

$21 \times 7 = \frac{147}{7}$ Anſwer.

4. Reduce $12\frac{2}{3}$ to an improper fraction. Anſw. $\frac{38}{3}$
5. Reduce $\frac{38}{3}$ to a mixt number. Anſw. $12\frac{2}{3}$
6. Reduce $121\frac{11}{12}$ to an improper fraction. Anſw. $\frac{1463}{12}$
7. Reduce $\frac{1463}{12}$ to a mixt number. Anſw. $121\frac{11}{12}$
8. Reduce $\frac{147}{7}$ to a whole number. Anſw. 21
9. Reduce $15\frac{7}{8}$ to an improper fraction Anſw. $\frac{127}{8}$
10. Reduce $\frac{2608}{12}$ to a whole or mixt number. Anſw. $217\frac{4}{12}$

The

The Reaſon of this Rule.

As there is only a numerator wanting, the denominator being always aſſign'd ; if ſuch a numerator then be produced as will have the ſame ratio to the given denominator, as the numerator of the given fraction, has to its denominator, the thing is done. The reaſon is clear, becauſe whilſt the ſame ratio is preſerved between the numerator and denominator, the ſame value of the fraction remains. Conſequently, as the denominator of the given fraction is to its numerator, ſo is the aſſigned denominator to its numerator.

PROPOSITION III.

To reduce different Fractions into one Denomination retaining the ſame value.

RULE.

Multiply each numerator into all the denominators but its own, for a new numerator, and all the denominators for a common denominator.

EXAMPLES.

1. Reduce $\frac{2}{3}$, $\frac{3}{4}$, and $\frac{7}{8}$ to a common denominator.
1. no. 2. no. 3. no.
$2 \times 4 \times 8 = 64$ $3 \times 3 \times 8 = 72$ $7 \times 4 \times 3 = 84$; then $3 \times 4 \times 8 = 96$ denominator, therefore $\frac{64}{96}$, $\frac{72}{96}$, and $\frac{84}{96}$ are the new fractions required.

2. Reduce $\frac{4}{9}$ and $\frac{3}{7}$ to a common denominator.
Anſw. $\frac{28}{63}$ and $\frac{27}{63}$

3. Reduce $\frac{3}{5}$ and $\frac{2}{5}$ to a common denominator.
Anſw. $\frac{15}{25}$ and $\frac{10}{25}$

4. Reduce $\frac{3}{7}$, $\frac{2}{3}$, and $\frac{3}{4}$ to a common denominator.
Anſw. $\frac{36}{84}$, $\frac{56}{84}$, and $\frac{63}{84}$

5. Reduce $\frac{6}{7}$, $\frac{2}{3}$, and $\frac{1}{3}$ to a common denominator.
Anſw. $\frac{90}{105}$, $\frac{42}{105}$, and $\frac{35}{105}$

The

The Reaſon of this Rule.

As the purpoſed intention of this rule is to make the denominators alike, and the numerators proportioned thereto, as thoſe given are in proportion; if therefore denominators are multiplied by any numbers, that will make the products alike; and if the reſpective numerator be multiplied by the ſame number you multiplied its denominator, it will conſequently produce the ſame thing as this rule produces.

PROPOSITION IV.

To abbreviate or reduce Fractions into their Loweſt Denomination.

RULE.

Divide the greater number by the leſſer, and that diviſor by the remainder (if any) and ſo on continually until there be no remainder left; then will the laſt diviſor be the greateſt Common Meaſure; and if it happens to be 1, then are thoſe numbers termed prime and are already in their Loweſt Terms; if otherwiſe, divide the numerator and denominator by the Common Meaſure and their quotients will be the leaſt terms required.

EXAMPLES.

1. Reduce $\frac{48}{64}$ to its loweſt terms.

48)64(1
48
——
Com. meaſure 16)48(3
48
——

Then $48 \div 16 = 3$ the numerator; and $64 \div 16 = 4$ the denom. therefore $\frac{48}{64} = \frac{3}{4}$ Anſwer.

2. Reduce $\frac{24}{40}$ into its loweſt terms. Anſw. $\frac{3}{5}$
3. Reduce $\frac{336}{896}$ to its loweſt terms. Anſw. $\frac{3}{8}$

4. Reduce $\frac{288}{336}$ to its loweſt terms. Anſw. $\frac{6}{7}$

5. Reduce $\frac{576}{1728}$ to its loweſt terms. Anſw. $\frac{1}{3}$

The Reaſon of this Rule.

Two numbers, however different, if they are divided by one and the ſame number, the quotients will have like proportion as the numbers given to be divided have to each other.

PROPOSITION V.

To reduce Fractions of one name or denomination to another retaining the ſame value.

RULE.

I. When a Fraction is to be reduced from a leſs to a greater denomination, bring the given Fraction in a Compound one, by conſidering how many of the leſs make one of the greater denomination; then reduce this Compound Fraction to a Simple one, and it is done.

II. But when the given Fraction is to be bronght from a greater to a leſſer denomination, multiply the numerator by the parts contained in the ſeveral denominations between it, which it is to be reduced to for a new numerator, to which affix its given denominator; reduce this Fraction to its Loweſt Terms and you have the anſwer.

EXAMPLES.

1. Reduce $\frac{3}{4}$ of a penny to a fraction of a £. ſterling.

$\frac{3}{4}$ of $\frac{1}{12}$ of $\frac{1}{20}$ = £. $\frac{3}{960} = \frac{1}{320}$ Anſwer.

2. Reduce £. $\frac{3}{960}$ to the fraction of a penny.

$3 \times 20 \times 12 = \frac{720}{960}$ or thus, £. $\frac{3}{960}$ of $\frac{20}{1}$ of $\frac{12}{1}$ = $\frac{720}{960} = \frac{3}{4}$ Anſwer.

3. Reduce $\frac{5}{9}$ of a ſhilling to the fraction of a guinea. Anſw. $\frac{5}{189}$

4. Reduce $\frac{5}{189}$ of a guinea to the fraction of a ſhilling. Anſw. $\frac{105}{189}$ or $\frac{5}{9}$

5. Reduce $\frac{1}{4}$ of a penny to the fraction of a crown.
Anſw. $\frac{1}{240}$

6. Reduce $\frac{1}{240}$ of a crown to the fraction of a penny.
Anſw. $\frac{60}{240} = \frac{1}{4}$

The Reaſon of this Rule.

Queſtion 1. will ſufficiently illuſtrate this Propoſition. For 12*d.* = 1*s.* $\frac{3}{4}$ of a penny is $\frac{3}{4}$ of $\frac{1}{12}$ of a ſhilling; and as 20*s.* = £. 1. it conſequently muſt be $\frac{3}{4}$ of $\frac{1}{12}$ of $\frac{1}{20}$ which by Propoſition 1. is = £. $\frac{3}{960}$ or $\frac{1}{320}$.

PROPOSITION VI.

To find the value of a Fraction in money, weight, or meaſure.

RULE.

Multiply the numerator by the common parts of the integer and divide by the denominator.

EXAMPLES.

1. What is the value of $\frac{7}{8}$ of a £. ſterling?

$7 \times 20 = 140 \div 8 = 17\frac{4}{8}s.$ $4 \times 12 = 48 \div 8 = 6d.$

Or thus, £. $\frac{7}{8}$ = 17*s.* 6*d.*

```
         20
         —
       8)140
       ————    4
  ſhill. 17   12
       ————   —
         8 ) 48
              —
      pence   6
              —
```

Proof 17*s.* 6*d.* = $17\frac{1}{2}s.$ the improper fraction of which is $\frac{35}{2}s.$ of $\frac{1}{20}$ = £. $\frac{35}{40}$ = £. $\frac{7}{8}$.

2. Find the value of $\frac{17}{19}$ of a £. ſterling.
Anſw. 17*s*. 10½*d*. + $\frac{18}{19}$

3. Reduce $\frac{8}{13}$ of a ſhilling to its proper quantity.
Anſw. 7¼*d*. + $\frac{7}{13}$

4. Required the value of £. $\frac{3}{8}$ Anſw. 7*s*. 6*d*.

5. Reduce $\frac{2}{7}$ of 3 cwts. 1 qr. 14 lbs. to its proper quantity. ——— ——— Anſw. 3qrs. 24lbs.

6. What is the value of $\frac{3}{5}$ of a lb. troy?
Anſw. 7 oz. 4 dwts.

7. What is the value of $\frac{6}{7}$ of a yard?
Anſw. 3qrs. 1$\frac{5}{7}$nail.

8. Reduce $\frac{7}{20}$ of an ell Engliſh to its proper quantity.
Anſw. 1 q. 3 n.

9. What is the proper quantity of $\frac{3}{9}$ of a barrel of beer?
Anſw. 12 gallons.

10. What is the proper quantity of $\frac{7}{8}$ of a tun of wine?
Anſw. 3 h. 31 g. 2 q.

11. Required the proper quantity of $\frac{5}{19}$ of an acre.
Anſw. 1 r. 2$\frac{2}{19}$ p.

12. Reduce $\frac{3}{10}$ of a day to its proper quantity.
Anſw. 7 h. 12 m.

The Reaſon of this Rule.

The reaſon thereof is manifeſt and and admits of the following proportion. As the denominator of the given fraction is in proportion to the unit of the denomination the fraction is part of, ſo is the numerator, or number of parts, to its value. Suppoſe ¾ £. for example.

4 : 20*s*. : : 3 : 15 ſhillings the anſwer

ADDITION of VULGAR FRACTIONS.

RULE.

ALL Compound Fractions muſt be reduced to Simple ones, and all fractions of different denominators, to a Common Denominator; then add all the numerators together, and their ſum placed over the common denominator is the anſwer: If there ſhould remain an improper fraction then reduce it to a mixt number and the work is done.

EXAMPLES.

1. Add $\frac{2}{3}$, $\frac{3}{4}$, and $\frac{7}{8}$ together.

Reduced $\frac{64}{} + \frac{72}{} + \frac{84}{96} = \frac{220}{96} = 2\frac{28}{96}$ or, $\frac{7}{24}$

2. Add $\frac{4}{9}$ and $\frac{3}{7}$ together. Anſw. $\frac{55}{63}$.

3. Add $\frac{2}{3}$ of $\frac{3}{4}$ and $\frac{2}{5}$ of $\frac{3}{8}$ together.

$\frac{2}{3}$ of $\frac{3}{4} = \frac{6}{12}$ and $\frac{2}{5}$ of $\frac{3}{8} = \frac{6}{40} \times \frac{6}{12} = \frac{72}{} + \frac{240}{480} = \frac{312}{480}$ or, $\frac{13}{20}$ Anſwer.

4. Add $\frac{2}{7}$ and $\frac{2}{3}$ of $\frac{3}{4}$ together. Anſw. $\frac{66}{84}$ or $\frac{11}{14}$.

5. Add $4\frac{1}{2}$, $5\frac{2}{3}$, and $6\frac{7}{8}$ together.

$\overset{2}{\frac{9}{2}} \times \overset{3}{\frac{17}{3}} \times \overset{8}{\frac{55}{8}} = \frac{216}{} \times \frac{272}{} \times \frac{330}{48} = \frac{818}{48} = 17\frac{1}{24}$ Anſ.

6. Add $7\frac{2}{3}$ and $2\frac{1}{2}$ together. Anſw. $10\frac{1}{6}$

7. Add $\frac{5}{6}$ of a ſhilling to $\frac{3}{4}$ of a £.

$\frac{5}{6}$ of $\frac{1}{20} = \frac{5}{120} \times \frac{3}{4} = \frac{20}{} + \frac{360}{480} = \frac{380}{480} =$ 15*s.* 10*d.* Anſ.

8. Add $\frac{2}{3}$ of a £. to the $\frac{3}{5}$ of a ſhilling.
Anſw. $\frac{209}{300} =$ 13*s.* $11\frac{1}{5}$*d.*

9. Add $\frac{2}{5}$ of an ell Engliſh to $\frac{3}{4}$ of a nail. Anſw. $2\frac{3}{16}$q.

10. Add $\frac{2}{3}$ of a year to the $\frac{7}{8}$ of a week, allowing 52 weeks to the year. Anſw. $\frac{853}{1248} =$ 8 m. 3 w. 3 d. 19 h.

The Reaſon of this Rule.

The reaſon why fractions are firſt reduced to a common denominator, before you can aſcertain their ſum total, is becauſe the aggregate of moſt fractions could not otherwiſe be diſcovered; for a fraction is more or leſs according as the numerator is more or leſs than its denominator; ſo that the numerators are only added.

SUBTRACTION of VULGAR FRACTIONS.

RULE.

REDUCE all compound fractions to ſimple ones, and all to a common denominator; then ſubtract the numerator of the leſs fraction from the numerator of the other, and place the difference over the denominator. When the loweſt fraction is greater than the upper, ſubtract the numerator of the lower fraction from the denominator, and to that difference add the upper numerator carrying one to the units place of the lower whole number.

EXAMPLES.

1. From $\frac{2}{3}$ take $\frac{3}{7}$.

$\frac{2}{3} \times \frac{3}{7} = \frac{14}{\quad} - \frac{9}{21} = \frac{5}{21}$ $\left.\begin{matrix}\text{numer.}\\ \text{denom.}\end{matrix}\right\}$ Anſw.

Proof. Add $\frac{3}{7}$ and $\frac{5}{21}$. $\frac{3}{7} \times \frac{5}{21} = \frac{63}{\quad} + \frac{35}{147} = \frac{98}{147} = \frac{2}{3}$

2. Lent £. $154\frac{7}{28} = 154 : 5$ } Proof by common
Received $84\frac{21}{28} = 84 : 15$ } ſubtraction.

Anſw. $69\frac{14}{28}$ = £69 : 10 Anſwer.

3. From $\frac{3}{4}$ take $\frac{2}{7}$ —— — Anſw. $\frac{13}{28}$
4. From $\frac{1}{3}$ of 21 take $\frac{3}{4}$ of 9. — Anſw. $\frac{3}{12}$ or $\frac{1}{4}$
5. From $\frac{2}{3}$ of 72 take $\frac{1}{4}$ of 32. —— Anſw. 40
6. From $15\frac{11}{12}$ take $\frac{1}{3}$ of $\frac{2}{8}$ of $\frac{3}{4}$ — Anſw. $15\frac{41}{48}$

7. From $\frac{3}{4}$ £. take $\frac{5}{6}$ of a ſhilling.

$\frac{5}{6}$s. of $\frac{1}{20} = \frac{5}{120}$l. $\times \frac{3}{4} = \frac{360}{\quad} - \frac{20}{480} = \frac{340}{480}$l. = 14s. 2d.

8. From $\frac{2}{3}$ of a £. take the $\frac{3}{5}$ of a ſhilling.

Anſw. 12s. $8\frac{3}{4}\ \frac{1}{5}$d.

9. Subtract $\frac{3}{4}$ of a nail from $\frac{2}{5}$ of an ell Engliſh.
Anſw. 1q. $3\frac{1}{4}$n.

10. From $\frac{2}{3}$ of a year take the $\frac{7}{8}$ of a week.
Anſw. 8m. 1w. 5d. 13h.

The Reaſon of this Rule.

It is evident from what was ſaid of addition, relative to common denominators; if their denominators are alike, the difference between their numerators is the difference between their fractions, as may be proved by adding that difference to the fraction ſubtracted.

MULTIPLICATION

Of VULGAR FRACTIONS.

RULE.

Multiply their numerators together for a new numerator, and their denominators together for a new denominator; remembering to reduce compound fractions to ſimple ones, and mixt numbers to improper ones.

EXAMPLES.

1. Multiply $\frac{3}{4}$ of $\frac{2}{3}$ by $\frac{2}{3}$ of $\frac{1}{3}$.
Anſw. $\frac{6}{12} \times \frac{2}{9} = \frac{12}{108}$ or $\frac{1}{9}$
2. Multiply $\frac{2}{3}$ by $\frac{4}{5}$ —— —— Anſw. $\frac{8}{15}$
3. Multiply $\frac{7}{9}$ by $\frac{8}{11}$. —— — Anſw. $\frac{56}{99}$
4. Multiply $\frac{2}{5}$ of $\frac{3}{4}$ by $\frac{5}{6}$. —— Anſw. $\frac{30}{120}$ or $\frac{1}{4}$
5. Multiply $8\frac{1}{2}$ by $\frac{2}{7}$. —— Anſw. $2\frac{3}{7}$
6. Multiply 24 by $\frac{2}{5}$. —— — Anſw. $9\frac{3}{5}$
7. Multiply $7\frac{1}{2}$ by $5\frac{1}{4}$. —— Anſw. $39\frac{3}{8}$
8. Multiply $\frac{3}{5}$ of 21 by $\frac{3}{8}$. —— Anſw. $4\frac{29}{40}$
9. Multiply 12 by $\frac{1}{2}$ of 4. —— Anſw. 24

The Reaſon of this Rule.

If a fraction be multiplied by one it produceth the fraction given; if by $\frac{1}{4}$ it produceth $\frac{1}{4}$ the fraction given, &c. ſo that to multiply $\frac{3}{5}$ by $\frac{5}{12}$ gives $\frac{3}{5}$ of $\frac{5}{12}$ or $\frac{15}{60} = \frac{1}{4}$. Which is fully explained in the reaſon of the rule to Prop. 4.

Here you ſee the difference of the operation in fractions to that given in whole numbers; for the product is always leſs than the multiplicand, though 'tis greater in whole numbers; the former being the multiplying of the parts into which a unit is divided, which muſt needs make the parts produced leſs than thoſe given; the latter multiplying units, muſt in courſe augment the numbers. Therefore the former decreaſes the parts of an unit to infinite littleneſs, while the latter augments the number of units to infinity.

DIVISION of VULGAR FRACTIONS.

RULE.

MUltiply the numerator of the dividend by the denominator of the diviſor, and their product ſhall give the numerator of the quotient: then multiply the denominator of the dividend by the numerator of the diviſor, and their product ſhall give the denominator, obſerving to prepare your fractions as already directed.

EXAMPLES.

1. Divide $\frac{3}{8}$ by $\frac{3}{4}$ of $\frac{5}{6}$ of $\frac{2}{3}$.

$\frac{3}{8} \div \frac{30}{72} = \frac{216}{240} = \frac{9}{10}$ Anſw.

2. Divide $\frac{7}{8}$ by 5. —— —— Anſw. $\frac{7}{40}$
3. Divide 4 by $\frac{3}{5}$. —— —— Anſw. $6\frac{2}{3}$
4. Divide 55 by 99. —— Anſw. $\frac{5}{9}$

5. Divide $\frac{1}{2}$ of $\frac{2}{5}$ by $\frac{2}{3}$ of $\frac{3}{4}$. —— Anſw. $\frac{2}{5}$
6. Divide $\frac{3}{8}$ of 12 by $\frac{1}{2}$ of 4. —— Anſw. $2\frac{1}{4}$

The Reaſon of this Rule is obvious by the two following

AXIOMS.

I. To make a fraction greater in value, multiply (or add to) its numerator; or divide or take from its denominator.

II. To make a fraction leſs in value, multiply (or add to) its denominator; or divide or take from its numerator.

* * *

PROPORTION;

OR,

The RULE of THREE

In VULGAR FRACTIONS.

RULE.

WHEN the fractions are reduced and the queſtion ſtated, multiply the denominator of the firſt number into the numerator of the ſecond and third numbers, for a new numerator; and the numerator of the firſt number into the denominator of the ſecond and third, for a new denominator, and the product gives the anſwer.

EXAMPLES.

1. If $\frac{3}{5}$ of an ell Engliſh coſt $\frac{5}{6}$ of £. what coſt $12\frac{1}{2}$ ells?

E. £. £. £. *s.* *d.*

$\frac{3}{5} : \frac{5}{6} :: \frac{25}{2} = \frac{625}{36} = 17 : 7 : 2\frac{1}{2}\ \frac{2}{3}$. Anſw.

Or thus,

$\frac{5}{6}l. + \frac{25}{2} = \frac{125}{12} \div \frac{3}{5} = \frac{625}{36}l.$

2. If $\frac{2}{3}$ of a yard of cambric coſt $4\frac{26}{48}$*s.* what will $\frac{50}{3}$yd. coſt at the ſame rate?

$\frac{2}{3}$: $\frac{109}{24}$*s.* : : $\frac{50}{3}$ = $\frac{16350}{144}$*s.* = £5. 13*s.* $6\frac{1}{2}$*d.* Anſ.

3. If $\frac{3}{4}$ of a yard coſt $\frac{4}{5}$ of a £. what coſt $25\frac{7}{8}$ yards?

Anſw. £27. 12*s.*

4. Sold $\frac{50}{3}$ yards of cloth for 5*l.* $13\frac{13}{24}$*s.* what was the value of $\frac{2}{3}$ of a yard? —— Anſw. 4*s.* $6\frac{1}{2}$*d.*

5. A goldſmith ſold a tankard for $7\frac{11}{15}$*l.* at the rate of $18\frac{7}{8}$*s.* for every 3 ounces, what was the weight of it?

Anſw. 24oz. 11 dwts. $15\frac{111}{151}$ grs.

6. Bought 5 peices of cambric each piece containing $25\frac{7}{8}$ yds. and gave after the rate of $7\frac{6}{11}$*s.* for every $\frac{2}{3}$ of a yd. what was the total coſt? Anſw. £73. 4*s.* $3\frac{1}{4}\ \frac{10}{11}$*d.*

7. How many pieces of $\frac{8}{8}$, each $4\frac{9}{13}$*s.* ſterling, are in $257\frac{2}{3}$ guineas? —— Anſw. $1151\frac{296}{305}$

8. What is the commiſſion of a broker for ſelling $750\frac{7}{8}$ ſtock at $2\frac{5}{7}$*s.* per cent? Anſw. £1. —*s.* $4\frac{1}{2}\ \frac{99}{350}$*d.*

9. How much tea at $\frac{630}{5}$*d.* per lb. can I have in barter for $124\frac{7}{8}$yards at $3\frac{11}{15}$*s.* per ell Engliſh?

Anſw. $35\frac{1}{2}\ \frac{2}{25}$lbs.

10. How many crowns muſt be paid at Paris to receive in London $47\frac{2}{3}$ guineas exchange, at $4\frac{3}{5}$*s.* per crown?

Anſw. $217\frac{32}{69}$

THE

THE

Accountant's Companion;

OR,

Schoolmaſter's New Aſſiſtant.

PART III.

DECIMAL FRACTIONS.

~~DEFINITIONS.~~

~~1.~~ A Decimal is a fraction whoſe denominator is 1, with one or more cyphers annexed; as $\frac{2}{10}$ or $\frac{005}{1000}$,

In decimal fractions their figures expreſſed are the numerator, the denominator being omitted, becauſe known to be always an unit, with ſo many cyphers as there are places in the numerator.

~~II.~~ A decimal fraction is diſtinguiſhed from an integer by a point prefixed, as .2 for $\frac{2}{10}$, .005 for $\frac{005}{1000}$, &c.

Note, Cyphers at the right hand of a decimal alter not its value; for 2, or .2000 are the ſame value equal to $\frac{2}{10}$ or .2; but cyphers at the left-hand, in a decimal fraction, decreaſe the value in a tenfold proportion; for .02 is $\frac{2}{100}$ and .005 is $\frac{5}{1000}$.

ADDITION and SUBTRACTION.

Of DECIMALS.

ADDITION and SUBTRACTION of decimals are the ſame as in whole numbers when the places of the ſame denomination are ſet under each other.

EXAMPLES in ADDITION.

yds.	miles	years.
21.214	14.21	217.005
2.07	7.524	14.
411.005	.30	.41
41.8	.715	.07
476.089		

EXAMPLES in SUBTRACTION.

ells	buſh.	gall.	weeks
17.21	4.02	.411	47.
9.0082	.014	.141	.012
8.2018			

The reaſon of adding decimals thus, is ſufficiently ſhewn in vulgar fractions when reduced to a common denominator.

Subtraction of decimals is likewiſe the ſame as in vulgar fractions having the common denominator: for the difference between their numerators or numbers given, is the numerator of the anſwer.

MULTI-

MULTIPLICATION of DECIMALS.

RULE.

PLACE the factors and multiply them as in whole numbers, only in the product ſeparate with a point ſo many figures to the right hand as there are ~~[illegible]~~ Decimal places both in the multiplicand and multiplier; ~~then all the figures on the left hand of the point make the whole number, and thoſe on the right a decimal fraction; but~~ if there be not ſo many figures in the product, as ought to be ſeparated by the given rule, then place cyphers at the left to compleat the number. ✓

EXAMPLES.

.213	0.213
0.243	.243
639	639
852	852
426	426
51.759	.051759

3. What is the product of 4.17 by .325?
4. Multiply .327 by 0.21.
5. Multiply 21.3 by 2.13.

The Reaſon of this Rule.

This rule being the ſame as that in vulgar fractions 'tis obvious that by multiplying their given ſums together, you multiply their numerators; and by cutting off as many as are in both decimals given, you multiply their denominators, and divide that of their numerators by the product of their denominators.

DIVI-

DIVISION of DECIMALS.

~~RUL~~E.

THE operation is the ſame as in whole numbers, only in the quotient, ſeparate, with a point, ſo many figures to the right hand, for a decimal fraction, as there are fractional places in the dividend more than the diviſor, becauſe there muſt be ſo many fractional places in the diviſor and quotient together, as there are in the dividend.

Note 1. If there be more decimal places in the dividend than are in the diviſor and quotient together, place cyphers at the left hand of the quotient, to compleat the number.

2. Annex what number of cyphers you pleaſe to the right hand of the dividend; but if the dividend be made to have three fractional places more than are in the diviſor, there will be three ſuch places in the quotient, which, in moſt caſes, is ſufficient, except it is to be multiplied afterwards.

EXAMPLES.

Diviſ. divid. quot.

1. 375)349515.00(932.04
2. 37.5)3495.1500(93.204
3. 3.75)34.951500)9.3204
4. .375).34951500(.93204
5. .375).034951500(.093204

The Reaſon of this Rule.

I. If the decimal places in the diviſor and dividend are equal, it is clear that their denominators are equal and ſo their quotient is 1, conſequently the quotient of their numbers found is the true quotient ſought and all a whole number.

II. If thoſe of the dividend are moſt, then its denominator is greater, and if it is divided by the denominator of the diviſor the quotient is the difference.

III. If the denominator is greater than if we divide it by the denominator of the dividend, the quotient is a fraction.

IV. And as to the annexing cyphers to the dividend it is certain that they do not alter their value of the dividend, for they encreaſe numerator and denominator equally.

REDUCTION of DECIMALS.

~~PROPOSITION I.~~

To reduce a vulgar fraction to a decimal.

RULE.

DIvide the numerator by the denominator adding as many cyphers as you pleaſe, obſerving that the denominator muſt have as many places, beſide the point, as you added of cyphers.

EXAMPLES.

1. Reduce $\frac{3}{4}$ to a decimal.

4)3.00

.75 Anſw.

2. Reduce $\frac{7}{8}$ to a decimal of the ſame value.

Anſw. .875

3. Reduce $\frac{5}{395}$ to a decimal. — Anſw. .01265

4. Reduce $\frac{5}{26}$ to a decimal. — Anſw. .1923076+
5. Reduce 5 ſhillings to the decimal of a £. Anſw. .25
6. Reduce 7*s.* 4*d.* to a decimal of a £. Anſw. .36
7. Reduce 11*s.* 8*d.* to a decimal of a £. Anſw. .583
8. Reduce 6 furlongs to the decimal of a league. Anſw. .25
9. Reduce 9 gallons to the decimal of an hogſhead. Anſw. .14285+
10. Reduce $1\frac{6}{24}$ of a day to the decimal of a week. Anſw. .17857+

PROPOSITION II.

To find the value of a decimal in money, weight, or meaſure.

RULE.

Multiply the decimal given by the number of parts of the next inferior denomination, cutting off the decimals from the product; then multiply the remainder by the next inferior denomination, and ſo proceed till you have brought it in the leaſt known parts of an integer.

EXAMPLES.

1. What is the value of .4215 of a guinea?

$$\begin{array}{r} 21 \\ \hline 4215 \\ 8430 \\ \hline 8.8515 \\ 12 \\ \hline 10.2180 \\ 4 \\ \hline 872 \end{array}$$

Anſw.
8*s.* 10*d.* — .872

2. What is the value of .75 of a £? Anſw. 15*s.*
3. What is the value of .25 of a £? Anſw. 5*s.*
4. What is the value of .366 of a £? Anſw. 7*s.* 3¾*d.*+
5. What is the value of .583 of a £? Anſw. 11*s.* 7¾*d.*+
6. What is the length of .25 of a league? Anſw. 6 furlongs.
7. What is the proper quantity of .14285+ of an hogſhead? ——— Anſw. 8 gall. 3 q. 1.9964 p.
8. What is the proper time of .17857+ of a week? Anſw. 29 hrs. 59 min. 59.136 ſec.

The reaſon of this practice is already ſhewn that fractions are encreaſed by multiplying their numerators, and that proportionally to the multiplier.

PROPORTION;
OR,
The RULE of THREE
In DECIMAL FRACTIONS.

EXAMPLES.

1. IF a yard of cloth coſt 4*s.* 6½*d.* what will 25 yds. coſt? See q. 1. p.

4*s.* 6½*d.* = .227083

5

———

1135415

5

5.677075 = 5*l.* 13*s.* 6¼*d.*+

2. If 3 yards of cambric coſt 36*s*. 6*d*. what coſt 100 ells Engliſh? ——— Anſw. £76. —*s*. 10*d*.

3. What is the intereſt of 240*l*. 15*s*. for a year, at 4 per cent per annum?

240.75
.04
———
9.6300 = £9. 12*s*. 7*d*.+

4. Find the intereſt of 325*l*. 10*s*. for 1 year, at 5 per cent per annum. ——— Anſw. £16. 5*s*. 6*d*.

5. What is the intereſt of 250*l*. 15*s*. for $3\frac{1}{2}$ years, at 6 per cent per annum?

250.75
.06
———
15.0450 1 year
3
———
45.1350 3 years
7.5225 half a year
———
Anſw. 52.6575 for 3 years and an half.

6. What will £100. amount to, if it be forborn 4 years, at 5 per cent per annum, compound intereſt?

100 × .05 = 5
5+
Amount ——
1 year 105 × .05
=5.25
2 110.25×
=5.5125+
3 115.7625 × .05
5.7881
———
4 121.5506 Anſw.

By

By Practice.

	105*l.*	Amount 1 year
£.		
20 — ⅕	21	
5 — ¼	5 : 5	Int.
20 — ⅕	110 : 5	Am. 2 years
5 — ¼	22 : 1	
	5 : 10 : 3	Int.
	115 : 15 : 3	Am. 3 years
20 — ⅕	25 : 3 : — ½	
5 — ¼	5 : 15 : 9	Int.
£.	121 : 11 : —	Am. 4 years

7 What is the intereſt of 501*l.* 10*s.* for 5¾ years, at 5 per cent per annum? Anſw. £144. 3*s.* 7½*d.*

8. What will 100*l.* amount to, if it be forborn 5 years, at 4 per cent per annum compound intereſt?

Anſw. £121. 13*s.* 32.6786304*d.*

†‡† The anſwer by the tables is = £121. 13*s.* 3*d.* 2.4 for 5 years = 1.21665 × 100 = £121.665.

By the following TABLES *the Amount of One Pound Sterling may be found, for any Number of Years under* 21, *at* 3, 4, *and* 5 *per Cent per Annum, Compound Intereſt.*

	3 *per Cent*	4 *per Cent*	5 *per Cent*
1	1.03	1.04	1.05
2	1.0609	1.0816	1.1025
3	1.09273	1.12486	1.15763
4	1.12551	1.16986	1.21551
5	1.15927	1.21665	1.27628
6	1.19405	1.26532	1.3401
7	1.22987	1.31593	1.4071
8	1.26677	1.36857	1.47746
9	1.30477	1.42331	1.55133
10	1.34392	1.48024	1.6289
11	1.38423	1.53945	1.71034
12	1.42576	1.60103	1.79586
13	1.46853	1.66507	1.88565
14	1.51259	1.73168	1.97993
15	1.55797	1.80094	2.07893
16	1.60471	1.87298	2.18288
17	1.65285	1.94790	2.29202
18	1.70243	2.02582	2.40662
19	1.75351	2,10685	2.52695
20	1.80611	2.19112	2.6533

CONSTRUCTION.

As 100 : 103 : : 1 : 1.03 = 1 year,
Then as 100 : 103 : : 103 : 1.0609 = 2 years, &c.

9. What will 450*l.* be augmented to in 12 years, at 3 per cent per annum, compound intereſt?

12 years = 1.42576 × 450 = 641.592 = 641*l.* 11*s.* 10.08*d.*

10. I demand the amount of 500*l.* when forborn 10 years, at 4 per cent per annnm.

Anſw. £740. 2*s.* 4*d.* 3.2qrs.

11. In what time will 450*l.* amount to 641*l.* 11*s.* 10.08*d.* at 3 per cent?

641.592 ÷ 450 = 1.42576 = 12 years anſw.

12. Lent 500*l.* at 4 per cent, compound intereſt, received 740*l.* 2*s.* 4*d.* 3.2qrs. in full payment, how long was the money in the borrower's hands? Anſw. 10 years.

Note. If the quotient be not exactly found in the table, the neareſt is the time required.

13. At what rate per cent will 450*l.* amount to 641*l.* 11*s.* 10.08*d.* in 12 years?

641.592 ÷ 450 = 1.42576 = 3 per cent, Anſw.

Note, The quotient or neareſt number muſt be ſought for in the table on a line with the given time.

14. Lent 500*l.* and received in 12 years the ſum of 740*l.* 2*s.* 4*d.* 3.2qrs. at what rate per cent was compound intereſt computed ——— Anſw. 4 per cent.

15. What principle muſt be put to intereſt, to amount to the ſum of 641*l.* 11*s.* 10.08*d.* in 12 years, at 3 per cent per annum?

641.592 ÷ 1.42576 = £450. Anſw.

16. What principal, being put to intereſt, will amount to 740*l.* 2*s.* 4*d.* 3.2qrs. in 10 years, at 4 per cent?

Anſw. £500.

The following TABLES *ſhew what One Pound Annuity, Penſion, &c. payable by Yearly Payments, for any Term not exceeding* 20 *Years, at* 3, 4, *and* 5 *per Cent, Compound Intereſt.*

	3 per Cent	*4 per Cent*	*5 per Cent*
1	1.	1.	1.
2	2.03	2.04	2.05
3	3.0909	3.1216	3.15250
4	4.18363	4.24646	4.31013
5	5.30914	5.41632	5.52563
6	6.46841	6 63298	6.80191
7	7.66246	7.89829	8.14201
8	8.89234	9.21423	9.54911
9	10.15911	10.5828	11.02656
10	11.46388	12.00611	12.57789
11	12.8078	13.48635	14.20679
12	14.19203	15.02581	15.91713
13	15.61779	16.62684	17.71298
14	17.08632	18.29191	19.59863
15	18.59891	20.02359	21.57856
16	20.15688	21.82453	23.65749
17	21.76159	23.69751	25.84037
18	23.41444	25.64541	28.13239
19	25.11687	27.67123	30.539
20	26.87037	29.77808	33.06595

CONSTRUCTION.

Take the firſt year's amount, which is 1*l.* multiply it by 1.03 + 1 = 2.03 = 2 years amount, which alſo multiply by 1.03 + 1 = 3.0909 = 3 years amount, &c.

17. What will an annuity of 30*l.* per annum, payable yearly, amount to in 11 years, at 3 per cent?

11 yrs. = 12.8078 × 30 = 384.234 = £384. 4*s.* 8.16*d.*

18. If an annuity of 50*l*. per annum, payable by yearly payments for 19 years, be forborn for that term, what will be the amount thereof, intereſt upon intereſt, at 5 per cent ? ——— Anſw. £1526. 19*s*.

19. What annuity, penſion, ſalary, &c. being forborne 11 years will amount to 384*l*. 4*s*. 8.16*d*. at 3 per cent ?

$$384.234 \div 12.8078 = £30. \text{ Anſw.}$$

20. What yearly income being omitted to be paid 19 years, will amount to 1526*l*. 19*s*. at 5 per cent ?

Anſw. £50.

21. In what time will an annuity of 30*l*. amount to 384*l*. 4*s*. 8.16*d*. at 3 per cent intereſt upon intereſt ?

$$384.234 \div 30 = 12.8078 = 11 \text{ years.}$$

22. In what time will an annuity of 50*l*. per annum amount to 1526*l*. 19*s*. at 5 per cent? Anſw. 19 years.

By the following TABLES *you have the worth of One Pound in ready Money, payable at the End of any Number of Years, Diſcount or Rebate, computed by Compound Intereſt for* 3, 4, *and* 5 *per Cent.*

	3 *per Cent*	4 *per Cent*	5 *per Cent*
1	.970874	.961538	.952381
2	.942596	.924556	.907029
3	.915142	.888996	.863838
4	.888487	.854804	.822702
5	.862609	.821927	.783526
6	.837484	.790315	.746215
7	.813092	.759918	.710681
8	.789409	.73[illegible]690	.676839
9	.766417	.702587	.644609
10	.744094	.675564	.613913
11	.722421	.649581	.584679
12	.701380	.624597	.556837
13	.680951	.600574	.530321
14	.661118	.577475	.505068
15	.641862	.555265	.481017
16	.623167	.533908	.458112
17	.605016	.513373	.436297
18	.587395	.493628	.415521
19	.570286	.474642	.395734
20	.553676	.456387	.376889

CONSTRUCTION.

1 ÷ 1.03 = 970874 firſt year's preſent worth, and .970874 ÷ 1.03 = .942596 2 years, and 942569 ÷ 1.03 = 915142 3 years, &c.

23. What is the preſent worth of 250*l.* payable 15 years hence, at 3 per cent?

15 = .641862 × 250 = 160.4655 = £160. 9*s.* 3*d.* 2.88

24. How much preſent money will diſcharge a debt of 500*l.* payable at the end of 10 years to come, allowing 4 per cent intereſt upon intereſt?

Anſw. £337. 15*s.* 7*d.* 3.72qrs.

25. If a ſum of money due 10 years hence, produce 337*l.* 15*s.* 7*d.* 3.72qrs. for the preſent payment, rebate at 4 per cent, what was the ſum firſt due?

337·782 ÷ 675564 = £500. Anſw.

26. There is a ſum of money due at the expiration of 15 years, but the creditor agrees to take 160*l.* 9. 3. 2.88 for preſent payment, allowing 3 per cent, what was the debt? —— —— Anſw. £250.

27. The preſent payment of 337*l.* 15*s.* 7*d.* 3.72qrs. is made for a debt of 500*l.* rebate at 4 per cent, in what time was the debt payable?

337·782 ÷ 500 = .675564 = 10 years.

28. Received 160*l.* 9*s.* 3*d.* 2.88qrs. for a debt of 250*l.* rebate 3 per cent, I demand in what time the debt was payable? —— —— Anſw. 15 years.

29. A debt of 500*l.* is due 10 years hence, but 337*l.* 15*s.* 7*d.* 3.72qrs. being the preſent payment, what was the rate per cent of the ſaid rebate?

337.782 ÷ 500 = 675564 = 4 per cent. Anſw.

30. A debt of 250*l.* is due in 15 years, but 160*l.* 9*s.* 3*d.* 2.88qrs. being the preſent worth, what was the rebate per cent? —— Anſw. 3 per cent.

A TABLE *ſhewing the Preſent worth of One Pound Annuity for any Number of Years under* 21, *Rebate at* 3, 4. *and* 5 *per Cent.*

	3 *per Cent*	4 *per Cent*	5 *per Cent*
1	.97087	.96154	.95238
2	1.91347	1.8861	1.85941
3	2.82861	2.77509	2.72325
4	3.71710	3.6299	3.54595
5	4.57971	4.45182	4.32948
6	5.41719	5.24214	5.07569
7	6.23028	6.00206	5.78637
8	7 01969	6.73275	6.46321
9	7.78611	7.43533	7.10782
10	8.5302	8.1109	7.72174
11	9.25262	8.76048	8.30641
12	9.954	9.38507	8.86325
13	10.63496	9.98565	9.39357
14	11.29607	10.56312	9.89864
15	11.93794	11.11839	10.37966
16	12.5611	11.6523	10.83777
17	13.16612	12.16567	11.27407
18	13.75351	12.6593	11.68958
19	14.3238	13.13394	12.08532
20	14.87748	13.59033	12.46221

CONSTRUCTION.

Divide 1*l.* by 1.03 = .97087 preſent worth for the 1ſt year, which divide 1.03 + 1ſt year = 1.91347 2 years preſent worth, then .97087 ÷ 1.03 and the quotient added to 1.91347 = 2.82861 the 3d years preſent worth, &c.

31. What is the preſent worth of an annuity of 30*l.* [illegible] annum to continue 11 years, at 3 per cent, compound intereſt ?

11=9.25262 × 30=277.5786 =£277.11*s.*6*d.*3.356qrs.

32. What is the preſent worth of a ſalary of 50*l.* per annum, to continue 19 years, at 5 per cent, compound intereſt? —— Anſw. £604: 5*s.* 3*d.* 3.36qrs.

33. If an annuity of 30*l.* per annum be ſold, to continue 11 years, for 277*l.* 11*s.* 6*d.* 3.356qrs. at what rate per cent was it computed?

277.57860 ÷ 30 = 9.25262 = 3 per cent. Anſw.

34. A gentleman granted an annuity of 50*l.* per annum to continue for the period of 19yrs. for 604*l.* 5*s.* 3*d.* 3.36qrs. at what rate per cent was the computation thereof?

Anſw. 5 per cent.

35. A lady purchaſed an annuity of 30*l.* at 3 per cent, compound intereſt, for 277*l.* 11*s.* 6*d.* 3.356qrs. how long was the annuity to continue? Anſw. 11 years.

36. What yearly income, to continue for 19 years, can be bought for 604*l.* 5*s.* 3*d.* 3.36qrs. allowing 5 per cent, compound intereſt? —— Anſw. £50.

THE

Accountant's Companion;

OR,

Schoolmaſter's New Aſſiſtant.

PART IV.

EVOLUTION;

OR,

The EXTRACTION of ROOTS.

DEFINITION.

EVOLUTION is the finding of the Roots of Numbers, either accurately, or in Decimals, till the Error be leſs than any propoſed number.

I. The SQUARE ROOT.

DEFINITION.

I. THE ſquare root is to find out ſuch a number as being multiplied into itſelf, the product will be equal to the given number.

RULE.

R U L E.

I. Seek a ſquare number either equal to, or the next leſs than the firſt period, which ſubtract from it, and place the root of the ſquare on the right of the given number, for the firſt figure of the root required: when done, to the remainder annex the ſecond period for a dividend; and on the left thereof write the double of the root already found, after the manner of a diviſor.

II. Conſider what figure, which if annexed to the diviſor, and the reſult multiplied by it, the product may be equal to, or the next leſs than the dividend, and it will be the next figure of the root. This done alſo, you muſt from the dividend ſubtract the product, and to the remainder bring down the next period for a new dividend: to which, as already directed, find a diviſor by doubling the figures found in the root; and from theſe find the next figure of the root, as in the laſt article, and ſo continue the operation till all the periods are uſed.

E X A M P L E S.

1. What is the ſquare root of 106929?

```
        .  .  .
       106929(327 Anſw.
        9
       ---
    62)169          Proof
       124     327 × 327 = 106929
       -----
   647) 4529
        4529
        ----
          0
```

2. What is the ſquare root of 63001? Anſw. 251

3. I demand the ſquare root of 576. Anſw. 24

4. I demand the ſquare root of 16168441.

Anſw. 4021

5. What is the ſquare root of 150624?

Anſw. 388.103

To extract the ſquare root of a VULGAR FRACTION: Extract the ſquare root of the numerator for a new numerator, and the denominator for a new denominator. But if you cannot extract the root thereof, reduce the vulgar fraction to a decimal and then proceed for its root.

6. What is the ſquare root of $\frac{576}{63001}$? Anſw. $\frac{24}{251}$
7. What is the ſurd root of $\frac{478}{549}$? Anſw. .93308+

Note, A ſurd is an imperfect ſquare, or ſuch number whoſe ſquare root can never be exactly found.

8. What is the ſquare root of $109\frac{217}{576}$? Anſw. $10\frac{11}{24}$
9. What is the ſquare root of $8\frac{5}{7}$? Anſw. 2.5298+

The Application to various Branches of the MATHEMATICS.

10. What is the mean proportional between 6 and 24?

$6 \times 24 = 144$ then $\sqrt{144} = 12$ the mean proportion.

11. What is the mean proportional number between 45 and 60? —— Anſw. 51.9 tenths

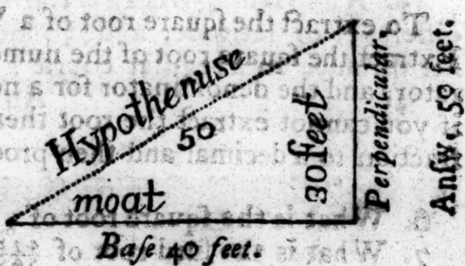
12. If an army conſiſting of a certain number of men were placed rank and file, *i. e.* in the form of a ſquare, each ſide having 174 men, I demand the whole number the ſquare contains? —— Anſw. 30.276

13. If an army, conſiſting of 30276 men, be formed into a ſquare, *viz.* ſo that the men in rank be equal to thoſe in file; how many men muſt each rank conſiſt of?

Anſw. 174

14. Suppoſe the rampart of a garriſon be 30 feet high, and the breadth of the moat ſurrounding it be 40 feet; how long muſt a ſcaling-ladder be to reach from the outſide of the moat to the top of the rampart?

40 × 40 = 1600
30 × 30 = 900
——
2500(50
25
—
0



15. There is a triangle, whoſe baſe is 60 yards and the perpendicular 45 yards; I demand the hypothenuſe?
Anſw. 75 yards.

I. To find the Area of any plain Triangle.

RULE.

From half the ſum of the three ſides, let each of the three ſides be ſeverally ſubtracted, then let the three differences and the ſaid half ſum be multiplied into one another continually, and the ſquare root of the laſt product ſhall be the content of the triangle.

16. If one ſide of a triangular field be 40 roods, another 50, and the third 60; what's the content of that field? —— Anſw. 838.52 ſquare roods.

II. The Hypothenuſe and Perpendicular, or Baſe given, to find the other Side.

RULE.

From the ſquare of the Hypothenuſe take the ſquare of the baſe, or perpendicular, and the ſquare root gives the anſwer.

17. Suppoſe a ſteeple, to whoſe vane a pennant is tied, which reaching the ground, is in length 49 yards, and the diſtance from the place it touches the ground to the middle of the ſteeple end is 16 yards, what is the height of the ſteeple? Anſw. 46 3 yards.

18. A ſhip ſailing from a certain port has made 64 miles difference of latitude, and 50 miles departure, what is her diſtance on a regular courſe?

Anſw. 81.2 miles diſtant.

The CUBE ROOT.

DEFINITION.

ANY number multiplied by its ſquare produces a cube. A cube is that which has length, breadth, and thickneſs.

RULE.

Point every third figure of the given cube, beginning at the units place, ſeek the greateſt cube to the firſt point, and ſubtract it therefrom, put the root in the quotient, and bring down the figures in the next point to the remainder for a reſolvend: then find a diviſor by multiplying the ſquare of the quotient by 3. Conſider how often it is contained in the reſolvend, rejecting the units and tens, and put the anſwer in the quotient. laſtly find your ſubtrahend. Cube the laſt figure in the quotient by 3 (the laſt excepted) and that product by the ſquare of the laſt: then multiply the diviſor by the laſt figure and add theſe products together which will give the ſubtrahend: ſubtract the ſaid ſubtrahend from the reſolvend, to the remainder bring down the next period and proceed as before.

EXAMPLES.

EXAMPLES.

19. What is the cube root of 12812904?

· · ·

12812904(234 Anſw.

8 = cube of 2

Sq. of 2 × 3 = 12) 4812 reſolvend

27 = cube of 3

54 = 2 × 3 × ſquare of 3

36 = diviſor × 3

4167 Subtrahend

Sq. of 23 × 3 = 1587) 645904 reſolv.

64 = cube of 4

1104 = 23 × 3 × ſquare of 4

6348 = Diviſor × 4

645904 ſubtrahend.

0

Proof

234 × 234 × 234 =

12812904

20. What is the cube root of 10648? Anſw. 22.

21. What is the cube root of 16777216? Anſw. 256.

22. What is the cube root of 259694072? Anſw. 638.

23. What is the cube root of 12895213625? Anſw. 2345.

To extract the cube root of any VULGAR or DECIMAL FRACTION, you muſt proceed in like manner as directed in the ſquare root, only in decimals annex 3 cyphers inſtead of 2.

24. What is the cube root of $\frac{1320}{4455}$? Anſw. $\frac{2}{3}$

25. What is the cube root of $\frac{3375}{10648}$? Anſw. $\frac{15}{22}$

26. Extract the cube root of $\frac{2}{3}$. Anſw. .873+

27. Extract the cube root of 32.768. Anſw. 3.2

28. Extract the cube root of 10,648. Anſw. 2.2

The Application of the Cube Root.

I. Solids being in the triple proportion to their ſides or diameters, the rule is therefore

As the cube of the given diameter is to the weight;
So is the cube of the other diameter to the weight of the other required.

29. If a bullet of 8 inches diameter weighs 72lb. I demand the diameter of another that weighs 9lb?

Anſw. 4 inches.

Cube of 8 = 512

Then as 72 : 9 : : 512 : 64 whoſe root is 4.

30. If a bullet that weighs 9lb. is 4 inches in diameter; what will be the diameter of that bullet that weighs 243lbs? —— Anſw. 12 inches.

II. To find the Side of a Cube that ſhall be equal in Solidity to any given ſolid, as a Globe, Cylinder, Priſm, Cone, &c.

RULE.

The cube root of the ſolid content of any ſolid body given, is the ſide of the cube of equal ſolidity.

31. There is a ſphere or globe, whoſe ſolid content is 32768 inches; what is the ſide of a cube of equal ſolidity? Anſw. 32 inches.

32. If a ſhip of 75 tuns be 40 feet long at the keel, of what length muſt the ſhip be that carries 600 tuns, ſuppoſing the burdens of ſhips to be as the cube of their keels? —— —— Anſw. 80 feet.

As 75 : 600 : : cube 40 to the ſhip's keel required;
The cube root of which gives the anſwer.

33. There is a cubical veſſel whoſe ſide is 9 inches, and it is required to find the ſide of another veſſel that is 6 times as much? —— Anſw. 17.386 inches.

* * *

Extraction of the BIQUADRATE ROOT.

DEFINITION.

ANY number which being involved 4 times into itſelf will produce the given number.

RULE.

Extract the ſquare root and then extract the ſquare root of that ſquare root, and you will have the biquadrate root required.

EXAMPLES.

34. What is the biquadrate root of 20736? Anſw. 12
35. Extract the biquadrate root of 50625. Anſw. 15
36. Let the biquadrate root of 14641 be extracted. Anſw. 11.

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PART V.

DUODECIMALS,

Applied to Work performed by Glaziers, Painters, Joiners, &c. To meaſuring by the Square 100 Feet, applied to Flooring, Tyling, Partitioning, &c.

DEFINITION.

DUodecimals are fractions of a foot, or of an inch, or any part of an inch, having 12 for their denominators.

RULE.

Multiply each term in the multiplicand by the feet in the multiplier; write each reſult under its reſpective term, carrying an unit for every 12, from each lower denomination to its next ſuperior: Proceed in like manner by multiplying the multiplicand by the inches or primes in the multiplier, and write the reſult of each term one place more to the right hand of thoſe in the multiplicand: ſo likewiſe proceed with ſeconds, thirds, and fourths of the multiplier, ſetting the reſult of each term two, three, or four places to the right hand of thoſe in the multiplicand.

EXAMPLES.

1. Multiply 5 feet 8 inches by 4 ft. 6 in.

By Practice.

5 : 8
4 : 6
―――――
22 : 8
2 : 10
―――――
Anſw. 25 : 6

5 : 8
4 : 6
―――――
22 : 8
6 in. — ½ | 2 : 10
―――――
25 : 6

By Fractions.

$5\frac{2}{3}$ ft. × $4\frac{1}{2}$ ft. $\frac{17}{3} \times \frac{9}{2} = \frac{153}{6} = 25\frac{1}{2}$ ft. Anſw.

Decimally.

5.666 × 4.5 = 25.497 Anſw. = 25 ft. 5 in. 6.768 ſec.

PROOF.

Reduce the factors into inches and divide their product by 144, the number of ſquare inches in a foot ſquare.

Ft. In. In. Ft. In.

$$\left.\begin{matrix} 5 : 8 = 68 \\ 4 : 6 = 54 \end{matrix}\right\} \times = 3672 \div 144 = 25 : 6$$

2. Multiply 9 ft. 8 in. by 7 ft. 6 in. Anſw. 72 ft 6 in.

3. Multiply 5 ft. 3 in. by 4 ft. 2 in.
Anſw. 21 ft. 10 in. 6 ſec.

4. Multiply 87 ft. 11 in. by 1 ft. 7 in.
Anſw. 139 ft. 2 in. 5 ſec.

5. Multiply 8 ft. 6 in. 9 ſec. by 7 ft. 3 in. 8 ſec.
Anſw. 62 ft. 6 in. 7 ſec. 9 thirds.

6. What is the ſquare of 5 ft. 4 in?
Anſw. 28 ft. 5 in. 4 ſec.

APPLI-

APPLICATION.

Joiners, Plaiſterers, Painters, Glaziers, Maſons Work, Paper Hangings, &c. are computed after the following Examples.

7. What does the glazing of 2 ſaſh frames come to, each ſaſh frame containing 8 ſquares, and each ſquare is 1ft. 2in. by 10in. 6ſec. at 15*d.* per foot?

```
                 ft. in.                ft. in.  s.   d.
                  1 : 2                 16 : 4 at 1 :  3 per foot
                      10 :  6 ſec.                     4
                 ___________              ___________
            |  — : 11 :  8                     5 : —
6ſec. — 1/2 |  — :  — :  7                         4
                 ___________              ___________
In 1 ſquare     1 :  — :  3          |   1 : — : —
                            4  4 — 1/3 |   — : — : 5
                ____________          ______________
                4 :  1 :  —          £. 1 . — : 5
                            4         ______________
  Feet in       ____________
16 ſquares 16 :  4 :  —
```

8. A room is to be cieled whoſe length is 46ft. 9in. and width 11ft. 6in. what will it come to at 3*s.* 8*d.* per yd?

Note 9 ſquare feet = 1 ſquare yard.

```
                     ft.  in.                  s.  d.
                     46 :  9                   3 : 8
                          11 :  6                  6
                     ______________            _______
             |       514 :  3               9)22 : —
6 in. — 1/2  |        23 :  4 :  6          _______
                     ______________            2 : 5¼
                  9)537                     _______
             |     59 6/9 yds.
                   ___________
3 : 8 — 11/60 |     9 :  3
                          2 : 5¼
                       ________
                £. 9 :  5 : 5¼ Anſw.
```

9. What is the content of a piece of wainſcotting in yards ſquare, that is 9 ft. 5 in. long, and 6 ft. 4 in. broad? and what will it come to at 7*s.* 4*d.* per yard?

9 : 5
6 : 4

56 : 6
4 in. — $\frac{1}{3}$ | 3 : 1 : 8

9)59

6$\frac{5}{9}$ yds.

7*s.* 4*d.* — $\frac{11}{30}$ | 2 : 4 : —
4 : — $\frac{3}{4}$ = $\frac{5}{9}$ of a yd.

£. 2 : 8 : — $\frac{3}{4}$

Let theſe Examples be proved in all its Varieties.

10. What does the glazing of 4 ſaſh frames come to, each ſaſh containing 6 ſquares, and each ſquare is 16 in. by 11 in. 6 ſec. at 2½*d.* per foot?

11. What muſt be paid for paving a court yard, if the length be 42 ft. 10 in. and the breadth 36 ft. 4 in. at 15*d.* per yard?

12. A room painted, 84 ft. 9 in. about 11 ft. 6 in. high, what does it come to at 2*s.* 3*d.* per yard?

13. What will the cieling of a room come to, whoſe dimenſions are 72 ft. 3 in. by 15 ft. 4 in. at 2*s.* 9*d.* per yd?

14. A room whoſe dimenſions are 96 ft. 8 in. by 11 ft. 3 in. what will it come to if the ſaid room be hung with India paper at 5*s.* 4*d.* per yd?

15. Suppoſing the height of a room to be 12 ft. 10 in. and the compaſs 84 ft. 3 in. what would it come to in wainſcotting, at the rate of 6*s.* 8*d.* per yd?

Meaſuring

Meaſuring by the Square of 100 Feet, as in Flooring, Partitioning, Roofing, Tyling, &c.

100 Square Feet the Integer.

Ft.	in.			Ft.	in.		
8 :	4	is	$\frac{1}{12}$	20 :	—	is	$\frac{1}{5}$
10 :	—	—	$\frac{1}{10}$	25 :	—	—	$\frac{1}{4}$
12 :	6	—	$\frac{1}{8}$	32 :	4	—	$\frac{1}{3}$
16 :	8	—	$\frac{1}{6}$	50 :	—	—	$\frac{1}{2}$

16. What will the flooring of a room coſt, whoſe dimenſions are 30 ft. 5 in. by 25 ft. 6 in. at 10*l.* 10*s.* 6*d.* per ſquare?

30 : 5
5

152 : 1
5

760 : 5
15 : 2 : 6

ſq. ft.
775 ÷ 100 = 7 : 75

50 ft. — $\frac{1}{2}$
25 ft. — $\frac{1}{2}$

10 : 10 : 6
7

73 : 13 : 6
5 : 5 : 3
2 : 12 : 7$\frac{1}{2}$

£. 81 : 11 : 4$\frac{1}{2}$ Anſw.

17. What will the flooring of ſeveral rooms come to, whoſe dimenſions are 250 ft. 10 in. by 11 ft. 4 in. at 7*l.* 15*s.* 10*d.* per ſquare?

18. A room whoſe dimenſions are 96 ft. 7 in. by 12 ft. 6 in. what will it coſt partitioning, at the rate of 9*l.* 10*s.* 4*d.* per ſquare?

19. What will 15 ſqs. 75 ft. of tyling come to at 16*s.* per ſquare?

SOLID MEASURE.

Multiply the length by the breadth, then multiply that product by the height, depth or thickneſs, the laſt product will be the ſolidity.

20. How many ſolid feet are there in a tree of 16 feet long, and 1 foot 6 inches ſquare?

1 : 6
1 : 6

---

1 : 6
— : 9

---

2 : 3
4

---

9 : —
4

Feet 36 : — Anſwer.

21. How many cubic feet does a bale contain whoſe length is 3 ft. 4 in. breadth 2 ft. 6 in. and depth 3 ft. 6 in.
Anſw. 29 ft. 2 in.

22. What is the ſolidity of a ſtone whoſe length is 6 ft. 9 in. breadth 7 ft. 3 in. and height 8 ft. 4 in.
Anſw. 407 ft. 9 in. 9 ſec.

A
COURSE
OF
BOOK-KEEPING,
According to the Method of
SINGLE ENTRY.

DESIGNED

For the Uſe of SCHOOLS in general;

FOR

YOUNG GENTLEMEN, before they enter upon
the Italian Method;

As well as thoſe who are intended for ſuch Kinds of
Buſineſs in which the latter is not
materially wanted.

By J. SEALLY.

LONDON:
PRINTED IN THE YEAR MDCCLXIX.

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A
COURSE
OF
BOOK-KEEPING.

DEFINITION.

I. BOOK-KEEPING is an art teaching how to record and diſpoſe the Accounts of Buſineſs, ſo as the true ſtate of every part, and of the whole, may be eaſily and diſtinctly known.

The **Books** uſed in this way of keeping accounts are chiefly two, viz. **Waste Book** or **Journal**, and **Ledger.**

II. 1. The Waſte-book, or Journal, contains all the tranſactions and dealings in a way of trade, narrated in a plain ſimple ſtile, and in order of time as they ſucceed each other.

III. 2. The Ledger contains all the ſeveral articles of each particular account, that lies ſcattered in the Waſte-book, according to their dates; and are collected and placed together in ſuch a manner, that the oppoſite parts of every account are ſet directly fronting one another, on oppoſite ſides of the ſame folio.

The WASTE-BOOK, or JOURNAL.

I. In the Waſte-book, every perſon is made debtor to the things he receives from you on truſt, and creditor by thoſe which you receive from him.

II. In the margin you have the folios where the accounts are to be found in the ledger, which will be found to be much better than the common method of making a daſh with the pen. By this method you know your folio without referring to the alphabet.

III. For the due agreement of the bills of parcels and book debts, you will find their ſums total, which will prove to make your accounts more accurate than the leaving them uncalculated till poſting. So likewiſe may the learner make out his own Ledger from this book, as he will find here entered what is received as well as what is delivered.

There are ſeveral other books generally uſed; as, the Invoice-book, Book of Sales, Bill-book, &c. but as they are all but meer copies, a ſight of them is ſufficient.

The LEDGER.

I. In this book you are to poſt the accounts entered in the Waſte-book, with their dates, obſerving to put on the debtor ſide of each perſon's account, thoſe accounts to which he or ſhe is debtor; and on the creditor ſide thoſe by which he or ſhe is creditor. If any account conſiſts but of one article, expreſs it particularly with its money in the columns; but if of ſeveral, write to or by ſundries, placing the total ſum of all the articles in the columns.

II. Under the proper letters in the alphabet inſert thoſe names with their folios; and remember not to enter any perſon's name again which has been already entered, till the ſpace aſſigned be filled with articles; then the account muſt be transferred to a new place.

III. When the firſt ledger is filled with accounts, transfer the accounts unbalanced to the ſecond Ledger B, and at the end of the old Ledger A, draw out a balance, placing your debts on one ſide, and your credits on the other.

WASTE-

WASTE-BOOK.

LONDON, January 1, 1769.

			£	s.	d.
1	**Mr. Val. Abchurch, Dr.**	£.			
	To a rich crimſon damaſk bed compleat —	100 : - : -			
	— a ſett of window curtains ——	25 : - : -			
		——	125	—	—
	5				
1	Sir John Benton, Dr.	£. s. d.			
	To a ſilver ſet of caſtors, wt. 25oz. 10dw. 10gr. at 7*s.* 6*d.* per oz. —	9 : 11 : 3			
	— a do. tea kettle and lamp, 50 oz. 10 dw. at 6*s.* 6*d.* per do. ——	16 : 8 : 3			
	— do. ſpoons 1 dozen, 38 oz. at 6*s.* 3*d.* dc.	11 : 17 : 6			
		——	37	17	—
	9				
1	Mrs. Eliz. Cunningham, Dr.	£. s. d.			
	To 1 pair of Indian cabinets, at 25*l.* each —	50 : -- : -			
	— 1 do. pier glaſſes —	30 : -- : -			
	— 1 chimney do. ——	11 : 10 : 6			
		——	91	10	6

			£.	s.	d.
	15				
1	Her Grace the Dutcheſs of Drayton, Dr.				
		£. s. d.			
	To 23 yds. of rich brocaded ſattin, at 18*s*. 6*d*. per yd. —	21 : 5 : 6			
	23 do. of do. at 21*s*. per yd.	24 : 3 : -	45	8	6
	24				
2	Mr. Henry Etherton, Dr.				
		£. s. d.			
	To 100 Univerſal Tutors	3 : 15 : -			
	6 doz. copy books —	1 : 7 : -	5	2	—
	29				
1	Mr. Val. Abchurch, Cr.				
	By caſh received in full	—	125	—	—
	Feb. 3.				
2	Samuel Fuller, Eſq; Dr.				
		£. s. d.			
	To 20 doz. red port at 18*s*.	18 : - : -			
	15 do. white do. 18*s*.	13 : 10 : -			
	10 do. claret — 48*s*.	24 : - : -	55	10	—

Mr.

			£.	s.	d.
	6				
	Mr James Benton, Cr.				
2	By 1 piece fine Iriſh, quant. 25 yds. at 4*s*. 6*d*.		5	12	6
	11				
2	The Rev. Mr. Euclid Green, Dr.	£. *s*. *d*.			
	To 6 ſets of Sturmius's Matheſis Juvenilia, 3 vols.	4 : 10 : -			
	Shakeſpeare's Plays by Johnſon, 8 vol.	1 : 11 : 6			
			6	1	6
	17				
3	Mr. William Hutton, Dr.				
	To 3½ yds. fine grey cloth, at 17*s*. 6*d*.		3	1	3
	21				
2	Mr. Henry Etherton, Dr.				
	To 1 doz. Salmon's Geographical and Hiſtorical Grammar		3	—	—

			£.	s.	d.
	25				
3	James Ingram, Eſq; Dr.	£. s. d.			
	To 12lb. impereal tea, at 23*s*.	13 : 16 : -			
	10 do. beſt bohea, at 15*s*. 6*d*.	7 : 15 : -			
	3 Sugar loaves wt. 30lb at 9*d*. per lb.	1 : 2 : 6			
			22	13	6
	27				
1	Mrs. Eliz. Cunningham, Dr.	£. s. d.			
	To 1 doz. fine matted chairs, at 15*s*. 6*d*.	9 : 6 : -			
	A fire ſcreen	2 : 2 : -			
			11	8	—
	March 1.				
3	Miſs Lucy Jennings, Dr.	£. s. d.			
	To 3 pair of kid gloves, at 2*s*.	- : 6 : -			
	A fan	- : 11 : 6			
	16 yds. fine lace, at 15*s*.	12 : -- : --			
	10 do. ribbon, at 9*d*.	-- : 7 : 6			
			13	5	—
	6				
2	The Rev. Mr. Euclid Green, Dr.				
	To 1 ſet of Dr. Smollet's Hiſtory of England, 5 vols.		1	10	—

			£.	s.	d.
	—— 13 ——				
1	Her Grace the Dutcheſs of Drayton, Dr.				
	To 23 yds. of flowered damaſk, at 10*s*. 6*d*. — ——		12	1	6
	—— 17 ——				
3	Capt. Charles Keen, Dr.				
	To 6 pieces of cloth, viz.	£. *s*. *d*.			
	No. 1. qt. 3 ps. dowlas, at 3*l*. 10*s*. —	10 : 10 : -			
	2. — 4 do. holland at 10*l*. 2*s*. 6*d*.	40 : 10 : -			
	4. — 2 do. cambric at 12*l*. 5*s*. —	24 : 10 : -			
	5. — 3 do. do. at 15*l*.	45 : -- : -			
	6. — 3 do. long lawn, at 10*l*. 10*s*	31 : 10 : -			
		——	152	—	—
	—— 28 ——				
2	Sir John Benton, Cr.				
	By bank note — ——		20	—	—
	—— April 5 ——				
4	Meſſrs. Love and Mann, Dr.				
	To 8 bags of hops, wt. 25 cwt. 2q. 14lb. at 11½*d*. per lb. ——		137	10	5

Mr.

	10		£.	s.	d.
4	Mr. Robert Earl, Cr.				
	By a bank note of — —		50	—	—
	11				
4	Mr. Daniel Newton, Dr.	£. s. d.			
	To 6 hhds. of ſugar, wt. 18 cwt. 2 q. 14 lb. at 1*l*. 15*s*. per cwt. —	32 : 16 : 3			
	6 barrels of raiſins, wt. 8 cwt. 1 q. 7lb. at 39*s*. 6*d*. per cwt. —	16 : 8 : 4			
			49	4	7
	16				
1	Mrs. Eliz. Cunningham, Cr.				
	By bank note, received in part —		50	—	—
	19				
4	Mr. Rupert Overton, Dr.	£. s. d			
	To oats 5 qrs. at 2*s*. 3*d*. per buſhel — —	4 : 10 : -			
	Beans, 9 buſh. at 4*s*. 6*d*.	2 : -- : 6			
	Bran 6 qrs. at 1*s*. 6*d*. —	3 : 12 : -			
			10	2	6

The

			£.	s.	d.
	22				
2	The Rev. Mr. Euclid Green, Dr.				
		£. s. d.			
	To 1 ſet of Biſhop Newton's prophecies, 3vol	- : 15 : -			
	1 doz. Petit's Hebrew guide —	1 : 10 : -			
	Philoſophical Tranſactions, 47 vol. —	42 : - : -			
			44	5	—
	29				
4	Colonel James Penton, Dr.				
		s. d.			
	To a Weſtphalia ham, wt. 20lb. at 9*d.* —	15 : —			
	6lb. anchovies, at 1*s.* 6*d.*	9 : —			
	6 do. capers, at 1*s.* 2*d.* —	7 : —			
			1	11	—
4	Colonel James Penton, Cr.				
	By caſh received in full	—	1	11	—
	May 2				
5	The Hon. Miſs Quick, Dr.				
		£. s. d.			
	To 12 yds. blue ſilk at 5*s.* 6*d.*	3 : 6 : -			
	12 do. green do. at 5*s.* 3*d.*	3 : 3 : -			
	9 do. white do. at 5*s.* 9*d.*	2 : 11 : 9			
	16 do. brocade, at 10*s.* 6*d.*	8 : 8 : -			
			18	8	9

			£.	s.	d.
	7				
3	James Ingram Eſq. Dr.				
	To 2 loaves double refin'd ſugar, wt. 27lb. at 13*d*. —		1	9	3
	10				
5	Major Geo. Roebuck, Dr.	£. *s*. *d*.			
	To 6 pair black ſilk ſtockings, at 12*s*. 6*d*. —	3 : 15 : -			
	6 do. white do. at 15*s*.	4 : 10 : -			
	6 do. worſted do. at 5*s*. 6*d*.	1 : 13 : -			
			9	18	
	12				
5	Mr. George Hurſt, Cr.				
	By 12 doz. Liſbon wine, at 17*s*. 6*d*. per doz. —		10	10	—
	17				
5	The Right Hon. Lord Swain, Dr.	£. *s*. *d*.			
	To a book-caſe with glaſs doors and furniture compleat —	50 : - : -			
	1 doz. elbow chairs	25 : 4 : -			
			75	4	—

			£.	s.	d.
	20				
2	The Rev. Mr. Euclid Green, Cr.				
	By a bill on Meſſrs. Bee and Cee, bankers — —		30	—	—
	27				
5	Mrs. Timberton of Briſtol, Dr.				
	To 4 pieces of cloth, viz.	£. s. d.			
	No. 1. 25½ yds. Iriſh at 4*s*. 3*d*.	5 : 8 : 4½			
	2. 26 do. of do. at 3*s*. 6*d*. —	4 : 11 : —			
	3. 24 do. long lawn at 10*s*. 6*d*.	12 : 12 : —			
	4. 23½ do. of do. at 11*s*. —	12 : 18 : 6	35	9	10½
	June 1				
2	Mr. Henry Etherton, Dr.	£. s. d.			
	To 1 doz. Sterling's Virgil	3 : - : -			
	1 do. do. Horace	3 : 5 : -			
	1 do. do. Terence	2 : 10 : 6	8	15	6
	6				
4	Mr. Rupert Overton, Dr.	£. s. d.			
	To 15 buſh. tares, at 1*s*. 6*d*.	1 : 2 : 6			
	12 do. peas, at 3*s*. 6*d*.	2 : 2 : -	3	4	6

		£.	*s.*	*d.*
	13			
6	Capt. David Upton, Dr.			
	To 12 Cheſhire cheeſes, wt. 6 cwt. 2 qrs. 14lb. at 30*s.* 6*d.* per cwt.	10	2	— $\frac{3}{4}$
	18			
2	Samuel Fuller, Eſq; Dr.			
	To 6 doz. Jamaica rum, at 1*l.* 5*s.* per doz. — —	7	10	—
	19			
6	Mr. Joſeph Vernon of Reading, Dr.			
	To 3 barrels of currants, weight 50 cwt. 2 qrs. at 36*s.* 6*d.* per C.	92	3	3
	25			
6	Mrs. Weſton of Bath, Dr.			
	To 3 pieces of muſlin, 75 yds. at 7*s.* 6*d.* per yd. —	28	2	6
	July 1			
6	Mr. Thomas Law, Cr.			
	By 3$\frac{1}{2}$ yds. ſuperfine cloth, at 18*s.* —	3	3	—

			£.	s.	d.
	8				
1	Sir John Benton, Cr.				
	By Caſh in full — —		17	17	—
	19				
1	Mrs. Eliz. Cunningham, Cr.				
	By caſh in full —		52	18	6
	21				
3	Mr. William Hutton, Dr.	£. s. d.			
	To 7 yds. ſuperfine ſcarlet cloth, at 19*s.* 6*d.* per yd. — —	6 : 16 : 6			
	14 do. drab, at 18*s.*	12 : 12 : -			
			19	8	6
	26				
2	Mr. Henry Etherton, Cr.				
	By caſh in part — —		10	10	—
5	The Hon. Miſs Quick, Dr.				
	To 15 yds. ſattin, at 9*s.* 6*d.* —		7	2	6

Hen-

		£	*s.*	*d.*
	31			
1	Her Grace the Dutcheſs of Drayton, Cr.			
	By caſh in full — —	57	10	—
	Aug. 4			
2	Samuel Fuller, Eſq; Cr.			
	By a bank note ——	30	—	—
	10			
3	Miſs Lucy Jennings, Cr.			
	By caſh in full — —	13	5	—
	16			
3	Capt. Charles Keen, Cr.			
	£. *s.* *d.*			
	By a pipe red port, at 4*s.* 6*d.* per gallon — 28 : 7 : -			
	1 do. white do. — 28 : 7 : -	56	14	—
	19			
5	The Right Hon. Lord Swain, Dr.			
	To a wrought dimity bed and furniture, compleat ——	31	10	—

Majo

		£.	s.	d.
	—— 23 ——			
5	Major Geo. Roebuck, Cr.			
	By caſh received in full ——	9	18	—
	—— 28 ——			
6	Mrs. Weſton of Bath, Dr.			
	To 4 pieces of linen, viz. £. s. d. No. 1. 27 yds. at 3*s*. 6*d*. 4 : 14 : 6 2. 25 do. 3 : 9 4 : 13 : 9 3. 26 do. 4 : 3 5 : 10 : 6 4. 27 do. 3 : 3 4 : 7 : 9			
		19	6	6
	—— Sep. 2 ——			
4	Mr. Rupert Overton, Cr.			
	By caſh in part ——	10	2	6
	—— 22 ——			
7	Mr. Robert Long, Cr.			
	By caſh borrowed ——	100	—	—
	—— 11 ——			
5	The Hon. Miſs Quick, Cr.			
	By caſh in full ——	25	11	3

Mrs.

			£.	s.	d.
	13				
7	Mrs. Ann Xerxes, Dr.	£. s. d.			
	To 12lb. raiſins of the ſun, at 5½*d.* per lb.	—:5:6			
	10 do. currants, at 7*d.* per lb. — —	—:5:10			
	12 do. malaga raiſins, at 5*d.* per lb. —	—:5:—			
			—	16	4
	14				
4	Meſſrs. Love and Mann, Dr.				
	To 10 bags of hops, wt. 32 cwt. 2 q. 7lb. at 15*d.* per lb.		227	18	9
	23				
3	James Ingram, Eſq; Cr.				
	By caſh in full —		24	2	9
	29				
5	The Right Hon. Lord Swain, Cr.				
	By bank note —		90	—	—

	Oct. 6.		£.	s.	d.
6	Capt. David Upton, Dr.	£. s. d.			
	To 10 Cheſhire cheeſes, wt. 5 cwt. 2 qrs. 5lb. at 31*s*. 6*d*. per cwt.	8 : 14 : 7¾			
	20 Glouceſter do. wt. 2 cwt. 1 qr. at 4¼*d*. per lb. —	4 : 9 : 3			
			13	3	10¾
	12				
3	Mr. William Hutton, Dr.				
	To 3½ yds. of green cloth, at 18*s*.		3	3	—
3	Mr. William Hutton, Cr.				
	By a bill on Mr. Lee, banker —		20	—	—
	15				
6	Mr. Joſ. Vernon of Reading, Dr.				
	To 1 hhd. of tobacco, wt. 8 cwt. 1 q. 10 lb. at 36*s*. 6*d*. per cwt.		15	14	4¼
	20				
1	Mr. Val. Abchurch, Dr.				
	To a wrought dimity bed and furniture, compleat —		27	10	6

	26	£.	*s.*	*d.*
7	Mr. Jonathan Young, Dr.			
	To 6 doz. brandy, at 1*l.* 1*s.* per doz.	6	6	—
	Nov. 3.			
4	Meſſrs. Love and Mann, Cr.			
	By a bill for ——	150	—	—
	11			
5	The Right Hon. the Lord Swain, Cr.			
	By caſh in full ——	16	14	—
	17			
4	Mr. Rupert Overton, Dr.			
	To 6 quarters of oats, at 2*s.* per buſh.	4	16	—
	21			
4	Meſſrs. Love and Mann, Cr.			
	By note on Sir James Donne, banker, due in 2 months ——	100	—	—
	24			
7	Mr. Samuel Ward, Cr.			
	£. *s.* *d.*			
	By 12 galls. rum, at 7*s.* 6*d.* 4 : 10 : - 10 do. brandy, at 7*s.* 3 : 10 : -	8	—	—

Mrs.

			£.	s.	d.
	26				
6	Mrs. Weſton of Bath, Cr.				
	By caſh in part ——		28	2	6
	29				
3	James Ingram, Eſq; Dr.				
		£. s. d.			
	To 10lb. imperial tea, at 22s. ——	11 : - : -			
	10 do. beſt bohea, at 15s. ——	7 : 10 : -			
		——	18	10	—
	Dec. 2				
7	Mr. Jonathan Young, Dr.				
	To 6 doz. Jamaica rum, at 24s. per doz. ——		7	4	—
	6				
5	The Hon. Miſs Quick, Dr.				
	To 23 yds. black ſilk, at 5s. —		5	15	—
	13				
3	Capt. Charles Keen, Cr.				
	By caſh in full ——		95	6	—

		£.	s.	d.
	16			
1	Mr. Val. Abchurch, Cr.			
	By note in two months on Mr. Samuel Law	20	—	—
	24			
4	Mr. Rupert Overton, Cr.			
	By caſh in full	8	—	6
	27			
7	Mr. Simon Zoraſter, Dr.			
	To a pipe of claret, at 15*s.* per gall.	94	10	—

End of the WASTE-BOOK.

LEDGER

LEDGER A.

ALPHABET.

A.		B.	
Abchurch (Val.)	1	Benton (Sir John)	1
		Benton (James)	2
E.		F.	
Etherton (Henry)	2	Fuller (Eſq;)	2
Earl (Robert)	4		
I.		K.	
Ingram (Eſq;)	3	Keen (Capt.)	3
Jennings (Lucy)	3		
N.		O.	
Newton (Dan.)	4	Overton (Rupert)	4
R.		S.	
Roebuck (Major)	5	Swain (Lord)	5
W.		X.	
Weſton (Mrs.)	6	Xerxes (Mrs.)	7
Ward (Samuel)	7		

ALPHABET.

C.		**D.**	
Cunningham (Eliz.)	1	Drayton (Dutcheſs)	1
G.		**H.**	
Green (Rev.	2	Hutton (William	3
		Hurſt (George)	5
L.		**M.**	
Love and Mann	4	Mann and Co.	4
Law (Thomas)	6		
Long (Robert)	7		
P.		**Q.**	
Penton (Col.)	4	Quick (Miſs)	5
T.		**U.**	
Timberton (Mrs.)	5	Upton (Capt.)	6
		Vernon (Joſ.)	6
Y.		**Z.**	
Young (Jon.)	7	Zoroaſter (Simon)	7

{ 1 }

		£.	s.	d.
1769	Mr. Val. Abchurch, Dr.			
Jan. 1.	To ſundries ——	125	—	—
Oct. 20.	To a dimity bed and furniture compleat ——	27	10	6
	Sir John Benton, Dr.			
Jan. 5.	To ſundries ——	37	17	—
	Mrs. Eliz. Cunningham, Dr.			
Jan. 9.	To ſundries ——	91	10	6
Feb. 27.	To ſundries ——	11	8	—
		102	18	6
	Her Grace the Dutcheſs of Drayton, Dr.			
Jan. 15.	To ſundries ——			
Mar. 13.	To 23 yds. damaſk, at 10*s.* 6*d.*	45	8	6
		12	1	6
		57	10	—

{ 1 }

1769	Per Contra, Cr.	£	s.	d.
Jan. 29.	By caſh in full ——	125	—	—
Dec. 16.	By a note on Mr. Samuel Law	20	—	—
	By account at folio 1 ledger B.	7	10	6
		27	10	6

	Per Contra, Cr.			
Mar. 28.	By bank note in part ——	20	—	—
July 8.	By caſh in full ——	17	17	—
		37	17	—

	Per Contra, Cr.			
April 16.	By a bank note ——	50	—	—
July 19.	By caſh in full ——	52	18	6
		102	18	6

	Per Contra, Cr.			
July 31.	By caſh in full ——	57	10	—

{ 2 }

1769	Mr. Henry Etherton, Dr.	£.	s.	d.
Jan. 4.	To ſundries —	5	2	—
Feb. 21.	To 1 doz. Salmon's grammar —	3	—	—
June 1.	To ſundries —	8	15	6
		16	17	6

	Samuel Fuller, Eſq; Dr.			
Feb. 3.	To ſundries —	55	10	—
June 18.	To 6 doz. Jamaica rum at 25s.	7	10	—
		63	—	—

	Mr. James Benton, Dr.			
	To account at folio 1 ledger B.	5	12	6

	The Rev. Mr. Euclid Green, Dr			
Feb. 11.	To ſundries —	6	1	6
Mar. 6.	To Dr. Smollet's Hiſtory of England, 5 vols. —	1	10	—
April 22.	To ſundries —	44	5	—
		51	16	6

{ 2 }

1769	Per Contra, Cr.	£.	*s.*	*d.*
July 26.	By caſh in part ——	10	10	—
	By account at folio 1 ledger B	6	7	6
		16	17	6
	Per Contra, Cr.			
Aug. 4.	By a bank note ——	30	—	—
	By account at folio 1 ledger B.	33	—	—
		63	—	—
	Per Contra, Cr.			
Feb. 6.	By 1 piece fine Iriſh, quant. 25 yds. at 4*s*. 6*d*. ——	5	12	6
	Per Contra, Cr.			
May 20.	By a bill on Meſſrs. Bee and Cee, bankers ——	30	—	—
	By account at folio 1 ledger B	21	16	6
		51	16	6

{ 3 }

1769	Mr. William Hutton, Dr.	£	s.	d.
Feb. 17.	To 3½ yds. fine grey cloth, at 17*s*. 6*d*.	3	1	3
July 21.	To ſundries	19	8	6
Oct. 12.	To 3½ yds. cloth, at 18*s*.	3	3	—
		25	12	9
	James Ingram, Eſq; Dr.			
Feb. 25.	To ſundries	22	13	6
May 7.	To 2 ſugar loaves, double refin'd, at 13*d*.	1	9	3
Nov. 29.	To ſundries	18	10	—
		42	12	9
	Miſs Lucy Jennings, Dr.			
Mar. 1.	To ſundries	13	5	—
	Capt. Charles Keen, Dr.			
Mar 17.	To ſundries	152	—	—

{ 3 }

1769	Per Contra, Cr.	£	s.	d.
Oct. 12.	By a bill on Mr. Lee, banker	20	—	—
	By account at folo 2 ledger B	5	12	9
		25	12	9

	Per Contra, Cr.	£	s.	d.
Sep. 23.	By caſh received ——	24	2	9
	By account at folio 2 ledger B	18	10	—
		42	12	9

	Per Contra, Cr.	£	s.	d.
Aug. 10.	By caſh in full — —	13	5	—

	Per Contra, Cr.	£	s.	d.
Aug. 16.	By ſundries received ——	56	14	—
	By caſh in full ——	95	6	—
		152	—	—

{ 4 }

		£.	s.	d.
1769	Meſſrs. Love and Mann, Dr.			
April 5.	To 8 bags of hops, wt. C25.2q. 14lb. at 11½*d.* per lb.	137	10	5
Sep. 10.	To 10 do. C32. 2q. 7lb. at 15*d.*	227	18	9
		365	9	2
	Mr. Robert Earl, Dr.			
	To account at folio 2 ledger B	50	—	—
	Mr. Daniel Newton, Dr.			
April 11.	To ſundries —	49	4	7
	Mr. Rupert Overton, Dr.			
April 19.	To ſundries —	10	2	6
June 6.	To ſundries —	3	4	6
Nov. 17.	To 6 quarters of oats, at 2*s.* —	4	16	—
		18	3	—
	Colonel James Penton, Dr.			
April 29.	To ſundries —	1	11	—

{ 4 }

1769	Per Contra, Cr.	£.	s.	d.
Nov. 3.	By a bill for ——	150	—	—
21.	By note on Sir James Donne, banker, 2 months ——	100	—	—
	By account at folio 2 ledger B.	115	2	2
		365	9	2
	Per Contra, Cr.			
April 10.	By a bank note ——	50	—	—
	Per Contra, Cr.			
	By account at folio 2 ledger B.	49	4	7
	Per Contra, Cr.			
Sept. 2.	By caſh in part ——	10	2	6
Dec. 24.	By caſh in full ——	8	—	6
		18	3	—
	Per Contra, Cr.			
April 29.	By caſh in full ——	1	11	—

{ 5 }

1769	The Hon. Miſs Quick, Dr.	£.	s.	d.
May 2.	To ſundries ——	18	8	9
July 26.	To 15 yds. ſattin, at 9*s*. 6*d*.	7	2	6
Dec. 6.	To 23 yds. black ſilk, at 5*s*.	5	15	—
		31	6	3
	Major Geo. Roebuck, Dr.			
May 10.	To ſundries ——	9	18	—
	Mr. Geo. Hurſt, Dr.			
	To account at folio 3 ledger B.	10	10	—
	The Right Hon. Lord Swain, Dr.			
May 17.	To ſundries ——	75	4	—
Aug. 19.	To a wrought dimity bed complete ——	31	10	—
		106	14	—
	Mrs. Timberton of Briſtol, Dr.			
May 27.	To ſundries ——	35	9	10½

{ 5 }

1769	Per Contra, Cr.	£.	s.	d.
Sep. 11.	By caſh received	25	11	3
	By account at folio 3 ledger B.	5	15	—
		31	6	3
	Per Contra, Cr.			
Aug. 23.	By caſh in full	9	18	—
	Per Contra, Cr.			
May 12.	By 12 doz. Liſbon wine, at 17*s.* 6*d.*	10	10	—
	Per Contra, Cr.			
Sep. 29.	By a bank note	90	—	—
Nov. 11.	By caſh in full	16	14	—
		106	14	—
	Per Contra, Cr.			
	By account at folio 3 ledger B.	35	9	10½

{ 6 }

1769	Capt. David Upton, Dr.	£.	s.	d.
June 13.	To 12 Cheſhire cheeſes, wt. C6.2q.14lb. at 36*s*. 6*d*. per C.	10	2	—¾
Oct. 6.	To ſundries ——	13	3	10¾
		23	5	11½

	Mr. Joſ. Vernon of Reading, Dr.			
June 19.	To 3 barrels currants, wt. C50. 2 qrs. at 36*s*. 6*d*. per Cwt.	92	3	3
Oct. 15.	To 1 hhd. tobacco, wt. C8.1q. 10lb. at 36*s*. 6*d*. per Cwt.	15	4	4¼
		107	7	7¼

	Mrs. Weſton of Bath, Dr.			
June 25.	To 3 pieces muſlin, 75 yds. at 7*s*6*d*.	28	2	6
Aug. 28.	To ſundries ——	19	6	6
		47	9	—

	Mr. Thomas Law, Dr.			
	To account at ſolio 4 ledger B.	3	3	—

(6)

1769	Per Contra, Cr.	£.	s.	d.
	By account at folio 3 ledger B.	23	5	11½
	Per Contra, Cr.			
	By account at folio 3 ledger B	107	7	7¾
	Per Contra, Cr.			
Nov. 26	By caſh in part ——	28	2	6
	By account at ſolio 4 ledger B.	19	6	6
		47	9	—
	Per Contra, Cr.			
July 1.	By 3½ yds. ſuperfine cloth at 18*s.*	3	3	—

{ 7 }

1769	Mr. Robert Long, Dr.	£	s.	d.
	To account at folio 4 ledger B	100	—	—
	Mrs. Ann Xerxes, Dr.			
Sept. 13.	To ſundries —	—	16	4
	Mr. Jonathan Young, Dr.			
Oct. 26.	To 6 doz. brandy at 21*s*. per doz	6	6	—
Dec. 2.	To 6 doz. Jamaica rum at 24*s*. per doz. — —	7	4	—
		13	10	—
	Mr. Samuel Ward, Dr.			
	To account at folio 4 ledger B.	8	—	—
	Mr. Simon Zoraſter, Dr.			
Dec 27	To a pipe of claret, at 15*s*. per gallon —	94	10	—

{ 7 }

1769	Per Contra, Cr.	£.	s.	d.
Sept. 6.	By caſh borrowed —	100	—	—
	Per Contra, Cr.			
	By account at folio 4 ledger B	—	16	4
	Per Contra, Cr.			
	By account at folio 4 ledger B	13	10	—
	Per Contra, Cr.			
Nov. 24.	By ſundries —	8	—	—
	Per Contra, Cr.			
	By account at folio 4 ledger B	94	10	—

{ 3 }

Balance, Drs.	£.	s.	d.
To Mr. Val. Abchurch, due to me	7	10	6
Mr. Henry Etherton	6	7	6
Samuel Fuller Eſq;	33	—	—
The Rev. Mr. Euclid Green	21	16	6
Mr. William Hutton	5	12	9
James Ingram, Eſq.	18	10	—
Meſſrs. Love and Mann	115	9	2
Mr. Daniel Newton	49	4	7
The Hon. Miſs Quick	5	15	—
Mrs. Timberton	35	9	10½
Capt. David Upton	23	5	11½
Mr. Joſeph Vernon	107	7	7¼
Mrs. Weſton	19	6	6
Mrs. Ann Xerxes	—	16	4
Mr. Jonathan Young	13	10	—
Mr. Simon Zoraſter	94	10	—
	557	12	3¼

{ 8 }

Per Contra,	Crs.	£.	*s.*	*d.*
By Mr. James Benton,	—	5	12	6
Mr. Robert Earl	—	50	—	—
Mr. George Hurſt	—	10	10	—
Mr. Thomas Law	—	3	3	—
Mr. Robert Long	—	100	—	—
Mr. Samuel Ward	—	8	—	—
		177	5	6

LEDGER

LEDGER B.

ALPHABET.

A.		B.	
Abchurch (Val.)	1	Benton (James)	1
E.		F.	
Etherton (Henry)	1	Fuller (Eſq;)	1
Earl (Robert)	2		
I.		K.	
Ingram (Eſq;)	2		
N.		O.	
Newton (Dan.)	2		
R.		S.	
W.		X.	
Weſton (Mrs.)	4	Xerxes (Mrs.)	4
Ward (Samuel)	4		

ALPHABET.

C.		D.	
G.		**H.**	
Green (Rev.)	1	Hutton (William	2
		Hurſt (George)	3
L.		**M.**	
Love and Co.	2	Mann and Co.	2
Law (Thomas)	4		
Long (Robert)	4		
P.		**Q.**	
		Quick (Miſs)	3
T.		**U.**	
Timberton (Mrs.)	3	Upton (Capt.)	3
		Vernon (Joſ.)	3
Y.		**Z.**	
Young (Jon.)	4	Zoroaſter (Simon)	4

1770

{ 1 }

1770	Mr. Val. Abchurch, Dr.	£.	*s.*	*d.*
	To account at folio 1 ledger A.	7	10	6
	Mr. Henry Etherton, Dr.			
	To account at folio 2 ledger A	6	7	6
	Samuel Fuller Eſq; Dr.			
	To account at folio 2 ledger A	33	—	—
	Mr. James Benton, Dr.			
	The Rev. Mr. Euclid Green, Dr.			
	To account at folio 2 ledger A	21	16	6

{ 1 }

1770	Per Contra, Cr.	£.	s.	d.
	Per Contra, Cr.			
	Per Contra, Cr.			
	Per Contra, Cr.			
	By account at folio 2 ledger A	5	12	6
	Per Contra, Cr.			

{ 2 }

1770	Mr. William Hutton, Dr.	£.	s.	d.
	To account at folio 3 ledger A.	5	12	9
	James Ingram, Eſq; Dr.			
	To account at folio 3 ledger A	18	10	—
	Meſſrs. Love and Mann, Dr.			
	To account at folio 4 ledger A	115	9	2
	Mr. Daniel Newton, Dr.			
	To account at folio 4 ledger A	49	4	7
	Mr. Robert Earl, Dr.			

{ 2 }

1770	Per Contra, Cr.	£	s.	d.
	Per Contra, Cr.			
	Per Contra, Cr.			
	Per Contra, Cr.			
	Per Contra, Cr.			
	By account at folio 4 ledger A	50	—	—

{ 3 }

1770	The Hon. Miſs Quick, Dr.	£.	*s.*	*d.*
	To account at folio 5 ledger A	5	15	—
	Mr. Geo. Hurſt, Dr.			
	Mrs. Timberton of Briſtol, Dr.			
	To account at folio 5 ledger A	35	9	10½
	Capt. David Upton, Dr.			
	To account at folio 6 ledger A	23	5	11½
	Mr. Joſ. Vernon of Reading, Dr.			
	To account at folio 6 ledger A	107	7	7¼

{ 3 }

1770	Per Contra, Cr.	£.	s.	d.
	Per Contra, Cr.			
	By account at folio 5 ledger A	10	10	—
	Per Contra, Cr.			
	Per contra, Cr.			
	Per contra, Cr.			

{ 4 }

1770	Mrs. Weſton of Bath, Dr.	£	*s.*	*d.*
	To account at folio 6 ledger A	19	6	6
	Mr. Thomas Law, Dr.			
	Mr. Robert Long, Dr.			
	Mrs. Ann Xerxes, Dr.			
	To account at folio 7 ledger A	—	16	4
	Mr. Jonathan Young, Dr.			
	To account at folio 7 ledger A	13	10	—
	Mr. Samuel Ward, Dr.			
	Mr. Simon Zoraſter, Dr.			
	To account at folio 7 ledger A	94	10	—

{ 4 }

1770	Per Contra, Cr.	£.	s.	d.
	Per Contra, Cr.			
	By account at folio 6 ledger A	3	3	—
	Per contra, Cr.			
	By account at folio 7 ledger A	100	—	—
	Per contra, Cr.			
	Per contra, Cr.			
	Per contra, Cr.			
	By account at folio 7 ledger A	8	—	—
	Per contra, Cr.			

SUPPLEMENT.

* * *

I. *Forms of* ACQUITTANCES *upon receipt of Money by Maſters, Agents, and Men of Buſineſs.*

RECEIVED, January 24, 1769, of Mr. John Loyd, Twenty-five Pounds, in full for a year's rent due at Chriſtmas laſt.

per *Martin Bird.*

£.25 : — : —

Received, February 10, 1770, of Meſſrs. Love and Mann, One hundred Pounds on account

Francis Green.

£.100 : — : —

Received, March 15, 1770, of Sir John Benton, Ninety Pounds Ten Shillings in full of all demands, for Co. and ſelf.

Lau Dunn.

£90 : 10 : —

II. PRO-

BRITISH MUSEUM 30 71

II. PROMISSORY NOTES.

London, Jan. 10, 1770.

I promiſe to pay to Mr. Charles Wren, or order, on demand, the Sum of Fifty Pounds, for value received.

W. Gould.

£50 : — : —

Briſtol, April 3, 1770.

We, or either of us, promiſe to pay to Meſſrs. Love and Mann, or their order, twenty days after date hereof the ſum of Sixty-ſix Pounds, for value received.

Witneſs our hands,

Charles White.

Geo. Stokes.

£66 : — : —

Dublin, May 4, 1770.

Two months after date hereof, I promiſe to pay to Samuel Fuller Eſq; or his order, One hundred Pounds for value received.

Thomas Keen.

£100 : — : —

III. BILLS *of* EXCHANGE.

London, May 10, 1770.

Twenty days after the date hereof, pay to Mr. William Good, or order, Seventy Pounds, value received of him, and place it to account of

your humble ſervant

B. Boddington.

To Mr John Ward,
Merchant at Liverpool.

Briſtol, June 9, 1769.

At ſight pay Mr. William Engliſh, or order, the ſum of Thirty Pounds Ten Shillings, for value received here of Mr. Charles Johnſon, and place it to the account, as per advice, from

your humble ſervant

To Meſſrs. Love and Mann,
Lombard-ſtreet, London.
Joſ. Green.

London, July 10, 1770, for 500 crowns, at 54*d.* per crown.

At uſance pay this my firſt bill of exchange, to Mr. Iſaac Loyd, or order, Five hundred Crowns, at Fifty-four Pence ſterling per crown, value of him received, and place it to the account, as per advice from

your humble ſervant

To Meſſrs. Grey and Droughton,
Merchants at Calais.
Aaron Earl.

IV. LETTERS *of* CREDIT.

SIR, Oporto, Jan. 3, 1768.

Pleaſe to furniſh the bearer, Mr. John Swain, with One hundred Pounds ſterling, in ſuch ſums as he ſhall have occaſion for, and require of you, exchange at 6*s.* 8*d.* ſterling per mill ree, for which take his receipt, and draw upon me, as per advice from

your humble ſervant

To Meſſrs. Darling and Booth,
Merchants in London.
Charles Dington.

SIR, London, June 19, 1770.

Pleaſe to furniſh the bearer, Mr. Thomas Long, with One hundred and fifty Pounds, as he ſhall require the ſame, and place it to my account, for which, this letter of credit, with his receipt, ſhall be your ſufficient voucher and warrant, giving upon payment a line of advice to

your very humble ſervant

To Mr. Geo. Hind,
Merchant at Briſtol.

Joſhua Arnold.

Received, June 30, 1770, of Mr. Thomas Long, One hundred and fifty Pounds, by virtue of Mr. Joſhua Arnold's letter of credit of June 19th inſtant, for the ſaid ſum.

James Daker.

£150 : — : —

Form

Form of an INVOICE.

London, July 8, 1769.

INVOICE of 3 bales of ſuperfine broad cloth, and 4 hhds. of ſugar ſhipped on board the King George of London, Capt. James Smith commander, for account and riſque of Mr. Samuel Picini, merchant of Leghorn, being marked and numbered as per margin. *viz.*

III.
No. 1 to 3.

Broad Cloth, 3 bales.

			£.	s.	d.
No. 1.	105 yds.				
2.	130				
3.	100				
	335 yds.	at 15*s*. per yd.	251	5	—

III.
No. 4 to 7.

Sugar 4 hhds.

	C.	q.	lb.	Tare. C.	q.	lb.
No. 4.	12	2	10	1	2	5
5.	10	1	14	1	—	20
6.	11	3	10	1	1	10
7.	12	—	22	1	1	21
Groſs	47	—	—	5	2	—
Tare	5	2	—			
	41	2	— neat			

41 : 2 : — neat at. 25*s* 6*d*.	52:18:3		
Coſt of hhds. and wrappers	2:10:-		
		55 : 8 : 3	
Bill of lading, &c. — —		1 : 5 : 6	
		307 : 18 : 9	
Commiſſion at £3. per cent.		9 : 4 : 9	
		£317 : 3 : 6	

Errors excepted per Geo. Fiſher.

FINIS.

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George Noble

Book

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Sums out of this
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G Noble